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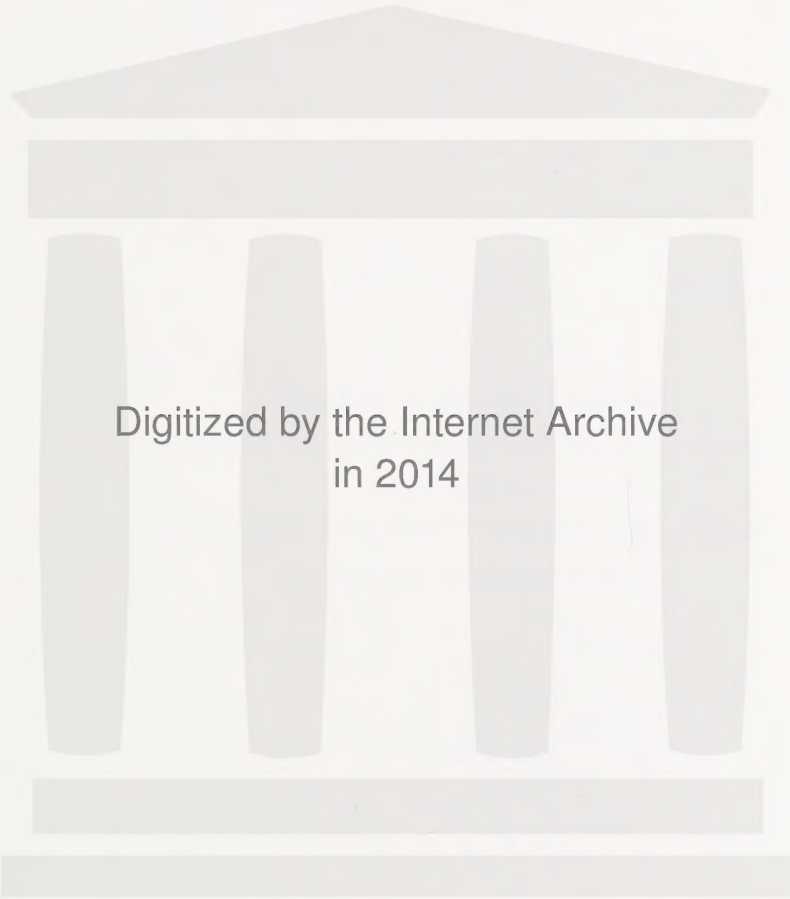
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BROOKLYN BRIDGE, FACT AND SYMBOL (1869-1930):

A STUDY OF AN AMERICAN MONUMENT

A THESIS

SUBMITTED TO THE FACULTY OF THE GRADUATE SCHOOL
OF THE UNIVERSITY OF MINNESOTA

By
ALAN TRACHTENBERG

IN PARTIAL FULFILLMENT OF THE REQUIREMENTS

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DOCTOR OF PHILOSOPHY

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PREFACE

This study has two general purposes. One is to show that Brooklyn Bridge has the status of a symbol in American culture. The other is to examine specific uses of the symbol. By calling the bridge a symbol, I mean that a large number of Americans have imputed to the bridge meanings that do not come out of the factual life of the structure itself. The symbolic meanings come from the ideas and feelings of people, from their common lives in America. As a symbol, the bridge has served an important role in American culture. Alfred North Whitehead says, "The object of symbolism is the enhancement of what is being symbolized." Brooklyn Bridge has symbolized, and thus enhanced, America itself. It was designed as a monument to serve precisely that role.

A symbol serves a culture by formulating the leading ideas and feelings of that culture. A symbol makes these ideas and feelings articulate. As Whitehead points out, cultural symbols tend to become fixed and hard; they tend to arouse automatic responses. The health of a people, he says, depends on their ability to keep a vibrant, fluid life in their symbols. This means that a genuine symbol needs to be constantly questioned and re-examined.

To question a cultural symbol is, in effect, to question the inherited beliefs of a culture. A genuine symbol does not suffer in this process; instead, it gains stature.

Brooklyn Bridge, both the fact and the symbol, came into existence in a period of deep change, the change from a rural to an urban society. The implications of this change have been profound, not only for the every-day patterns of life of Americans, but for their feelings and ideas about themselves as a nation. Because it was in many ways a symbol of this very change, a study of Brooklyn Bridge helps us reconstruct a crucial chapter in American life. Moreover, that chapter is hardly finished. The technological forces that arose in the nineteenth century and made a 1600 foot suspension bridge possible, now, in the twentieth century, threaten to annihilate mankind. A study of a mechanical, utilitarian object which also became a symbol, then, may have something to say to our times.

My deepest thanks are due to Professors Bernard Bowron and Dmitri Tselor. The debt I owe them for their many generousities is larger than I can express, except, perhaps, to say that I hope they will accept this study as acknowledgment of the debt.

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INTRODUCTION

CHAPTER I

WILDERNESS TRANSFORMED: A NEW-FANGLED DESTINY

The whole earth is the lords Garden & he hath given it to the sonnes of men w(th) a generall Condicion, Ge: 1. 28. Increase & multiply, replenish the earth & subdue it. . . why then should we stand hear striving for places of habitation. . . and in ye mean tyme suffer a whole Continent, as fruitful & convenient for the use of man to lie waste w(th)out any improvement.

John Winthrop, Conclusions for the
Plantation in New England

The Americans entered the wilderness as masters, determined to subdue it; and not as children of nature, nursed and brought up in its bosom. They could not at first love what was not theirs; and when it became theirs, they had already changed its face.

Francis Grund, The Americans-(1837)

At the Opening Ceremonies of Brooklyn Bridge on May 24, 1883, the well-known industrialist, statesman, and philanthropist, Abram S. Hewitt, began his oration with an image of what Manahatta must have looked like to the first white explorers, two hundred and seventy years before.

Nature wore a hardy countenance, as wild and as untamed as the savage landholders. . . The trees were lofty; and old, decayed and withered limbs contrasted with the younger growth of branches; and wild flowers

wasted their sweetness among the dead leaves and uncut herbage at their roots. The wanton grape vine swung carelessly from the topmost boughs of the oak and the sycamore. . .¹

It was a picture of a wilderness, savage and rich, untouched by the hand of man. Here was the initial fact of American life. From that first wild moment, this vision of untamed nature, going to waste amid exuberant growth and thick decay, had provoked in Americans a sense of destiny, to redeem nature for civilization. To cultivate the wilderness was a moral mission.

But the picture Hewitt described next would have startled the first beholders of the virgin land. Not a pastoral garden, but a thriving commercial emporium had replaced the solemn wilderness.

In the place of stillness and solitude, the footsteps of these millions of human beings; instead of the smooth waters "unvexed by any keel," highways of commerce ablaze with the flags of all nations; and where once was the green monotony of forested hills, the piled and towering splendors of a vast metropolis, the countless homes of industry, the echoing marts of trade, the gorgeous palaces of luxury, the silent and steadfast spires of worship!²

Here, indeed, was a more affecting vision for the 1880's. Such a pointed contrast between the extremes of nature and the extremes of civilization could not help but evoke what seemed to be the chief

¹Selected Writings of Abram S. Hewitt, ed. Allan Nevins (New York, 1937), p. 296.

²Ibid.

theme of American life, its rapid and thorough conquest of the original wilderness. To be sure, the conquest was not free of wrinkles, and Hewitt pointed out that the noisy quarrels between labor and capital was the major unsolved problem. Nevertheless, the triumph of American civilization could not be gainsaid. The Great Bridge made it a tangible fact.

Americans in the 1880's had no trouble finding a place in their minds for Brooklyn Bridge. It was an emblem of a destiny fulfilled. True, the bridge was a new experience for a society just entering a phase of large-scale construction, but it was not its newness which seemed most significant. Instead, the bridge was a link with the past. It seemed to complete and to justify the entire technological conquest of nature begun in the early days of the republic. It was, for example, a stirring fact to realize that this suspended connection between Long Island and Manhattan was literally the final link in a continental system. One writer exulted, "With the completion of this bridge the continent is entirely spanned, and one may visit, dry and shod and without the use of ferry boats, every city from the Atlantic to the Golden Gate."³ The bridge culminated a historical movement, the "internal improvement" of a continent.

There was, however, an unsuspected irony in this role of

³Willard Glazier, Peculiarities of American Cities (Philadelphia, 1886), p. 315.

the bridge. Early in the republic, Americans had thought of their continent as a guarantee of security and national greatness; it was their "manifest destiny" to possess the land. Internal improvements were the means of possession. Americans built roads and canals ostensibly for the sake of the land, of making it available for cultivation. They began with the land and the vision of a continental garden. In 1883, however, they found themselves with a machine, one of the most advanced products of engineering in the world. Internal improvements, in short, had led to industrialism and cities. The process of change raised a question which the early supporters of transportation had not considered: once the "land" is "improved," is it still the "land?" Is it still, that is, that source of security and virtue that Jefferson banked on? A land marked by railroad lines and power stations is far different from a land of self-sufficient homesteads. Throughout the internal improvements period, Americans behaved as though this was not a difference which made a difference. Our major economic practice since pre-Civil War days has been commercial and industrial; our major political rhetoric, however, has been rural and agrarian. The rhetoric invited the engineer and his tools to open the West for the farmers. But few Americans understood that the engineer built not only roads, he built a new way of life as well.

The consequences of industrialism, we recognize today, are quite profound; they affect our lives in all ways, from economics to art. We also recognize that the effect has been disruptive. But in 1883, Brooklyn Bridge, perhaps the supreme mechanical creation on the continent, seemed to bolster the feeling that American life was still intact, still healthy, still rooted in the soil, and still fulfilling its "manifest destiny." In 1930, this belief was not so easy to hold. In Hart Crane's The Bridge, Brooklyn Bridge failed to support the easy faith of 1883. In that poem, the bridge, as an Ideal, and the civilization it serves are "things irreconcilable." The purpose of this chapter is to show that the irreconcilability is not a result of Crane's peculiar temperament. Instead, it comes from currents that run deep in American life. It begins with the initial fact of man deciding that nature in the New World ought not go to waste.

I

Before anything else, Brooklyn Bridge is a road between two cities. After this fact comes the other: the bridge is also a symbol. A big reason for this second fact may be the traditional symbolic associations of all bridges, as a passage over water from one condition to another. But another reason, a strictly American

reason, comes out of the first fact, the fact that the bridge is a road. Through unique circumstances, physical and imaginative, roads have had an extra glitter to them in America. In the early years of the nineteenth century, roads excited rapture, and that's when the rapture of the Great Bridge itself began.

The rapid growth of transportation in pre-Civil War America was a plain economic fact; it answered the needs of an expanding society. But economics alone cannot satisfactorily explain the importance of that fact in American life. Americans have rarely thought of their society in strictly economic terms. In fact, as Henry Nash Smith has shown, the needs themselves were created as much by cultural myth as by economics; the idea of the West as a Garden of the World, the old dream of a northwest "passage to India," and the commitment to a "geographical predestination" all helped to create the very reality to which technology responded with roads and bridges.⁴ "Providence designed us to be a great and united Nation," an orator proclaimed in 1794, and geography was his proof: "Our lines are marked by the very hand of nature."⁵

⁴Henry Nash Smith, Virgin Land (Cambridge, Mass., 1950), chs. 1-4. For a discussion of the origins and uses of the concept of "geographical predestination," see Albert K. Weinberg, Manifest Destiny (Baltimore, 1935), ch. 2. For an account of the place of transportation in the pre-Civil War period, see George Rogers Taylor, The Transportation Revolution, 1815-1860 (New York, 1951).

⁵John B. Johnson, An Oration on Union (New York, 1784) p. 6.

What became clear as the westward expansion began, however, was that "the hand of nature" had laid down lines which were frequently barriers rather than gateways. The eastern mountain ranges as well as the many north-south rivers stood in the way of westward passage. But it was not only terrain which made difficulties. The promising geography also raised a political problem. Could the republican principle, which was best suited for small nations, work on so large a scale? Perhaps the very size of the continent would be the undoing of the nation.⁶

It is easy to see why transportation became a life and death matter. If geography bestowed an external grace upon the young society, it also posed a grave internal problem. In the early republic, therefore, the idea of "opening up" the West and "binding" it to the East became a focal point of national unity. All that was

⁶The idea that a democracy has "natural limits," determined by the distance between the central body and the most remote citizens, derived from the classical political theory of Plato and Aristotle, and more directly, from Montesquieu and Rousseau. Ideally, it was held that the entire populace should be able to assemble conveniently as often as the public functions required. In The Federalist XIV, Madison tried to allay the fear that the unprecedented geographical extent of the United States made federalism unworkable. Madison pointed out, among other arguments, that "improvements" will shorten distances and facilitate speedy travel; he also argued that geography itself would assist the new nation. He wrote, "The communication between the western and Atlantic districts, and between different parts of each, will be rendered more and more easy, by those numerous canals with which the beneficence of nature has intersected our country, and which art finds it so little difficult to connect and complete." The Federalist, ed. Goldwin Smith (New York, 1901), p. 69.



involved in the theme of "manifest destiny," then, came down to the practical issue of transportation. Indeed, the verb used over and again to express the idea of geographical unity, "to cement the Union," was more than a mere figure of speech. In short, facing an ambiguous geographical situation, full of promise yet full of barriers to that promise, American society had to become technological before it could become fully agrarian.

In the economic sense, the function of transportation is to create channels for the passage of goods. Farm communities needed these channels to bring their products to market. The economic survival of agrarian communities, then, depended upon internal improvements. But, to judge by its leading spokesmen, agrarianism was not merely, or even primarily an economic system. It was a morally superior way of life. Jefferson, for example, imagined the American farmer as a "noble husbandman," a man whose virtue came from the fact that he was engaged in "natural" work. Jefferson celebrated, and sought to foster, not only the work itself, of planting the seed and gathering the fruits, but the virtue, the health, the wholeness of the farmer. Agriculture, Jefferson felt, was the best way to nourish man's limited faculties of reason and moral

judgment. National health, therefore, depended upon a large and influential agricultural class, a class of "noble husbandmen."⁷

The independent yeoman of Jefferson's imagination, however, needed careful cultivation. The yeoman could not be tampered with. His virtue depended upon his self-sufficiency. He needed to be free from commercial entanglements, and isolated from the corruption of European feudalism. In America, the very land itself seemed to provide all the necessary protection. In his first inaugural address, Jefferson pointed out that America was "kindly separated by nature and a wide ocean from the exterminating havoc of one quarter of the globe;" America was "a chosen country, with room enough for our descendents to the hundreth and thousandth generation."

The logic of Jefferson's commitment to the land inevitably led him to transportation. As President, one of the few positive actions Jefferson permitted the central government was the building of roads and canals. In 1806, anticipating the liquidation of the public debt, he announced in his annual message to Congress a program for the "progress of improvement." This 1806 message, Henry Adams has pointed out, contained the crown of Jefferson's hopes for republican government. "Nowhere," wrote Adams, "in all the

⁷See A. Whitney Griswold, "The Jeffersonian Ideal," Farming and Democracy (New York, 1948), pp. 18-46, and Daniel Boorstin, The Lost World of Thomas Jefferson (New York, 1498).



long course of Mr. Jefferson's great career did he appear to better advantage than when in his message of 1806 he held out to the country and the world that view of his ultimate hopes and aspirations for national development, which was, as he then trusted, to be his last bequest to mankind."⁸ He proposed, first of all, a public institution of higher education, and second of all, a national system of internal improvements, "commensurate with the majesty of the country." "New channels of communication will be opened between the States," Jefferson said, "the lines of separation will disappear, their interests will be identified, and their union cemented by new and indestructible ties."

Jefferson's plan became a concrete program in 1808 in Secretary of the Treasury Albert Gallatin's Report on Public Roads and Canals. This document crystallized the early ideas of the technological aspects of expansion. It gave, as Carter Goodrich has pointed out, "coherence and intellectual organization to the proposals of a movement already vigorous."⁹ The report argued that because internal improvements were a national necessity, they should be public works supported by the government, and controlled

⁸Henry Adams, The Life of Albert Gallatin (New York, 1879), p. 349.

⁹Carter Goodrich, "National Planning of Internal Improvements," Pol Sci Q, Vol. 63 (1948), 28. For a discussion of the rhetorical appeals in favor of internal improvements, see by the same author, "Public Spirit and American Improvement," Am Philos Soc Proc, Vol. 92 (1948), 305-309.

by a single, comprehensive plan. The benefits of planned transportation, Gallatin argued, are these:

Good roads and canals will shorten distances; facilitate commercial and personal intercourse; and unite, by a still more intimate community of interests, the most remote quarters of the United States. No other single operation within the power of government can more effectively tend to strengthen and perpetuate that union, which secures external independence, domestic peace, and internal liberty.¹⁰

The main purpose of transportation, then, was unity. Roads would serve, not the market but the land itself. They would bind together and protect the agrarian republic.

Quite clearly, Jefferson and Gallatin did not anticipate that a federal system of roads would generate forces that would threaten the very agrarian idea they wished to foster. In the minds of less exalted thinkers, however, transportation was mainly a commercial necessity. It is enlightening to read the arguments of agrarians in support of Gallatin's program. In 1810, a congressman from western New York spoke to the issue. In that year, more than a million farmers were scattered throughout the western reaches of New York, Pennsylvania, and Virginia. They were well out of touch with the seaboard markets. The congressman deplored this isolation. His reasons were economic, not political.

¹⁰Albert Gallatin, Report of the Secretary of the Treasury on the subject of Public Roads and Canals, March 2nd, 1807 (Washington, 1816), p. 73.

There is no place where the great staple articles for the use of civilized life can be produced in greater abundance with greater ease, and yet as respects most of the luxuries and many of the conveniences of life the people are poor.¹¹

Here is a curious twist. The great productivity of the American soil, which had filled Jefferson with high hopes, proves to be insufficient for the full needs of the farmer; measured against "luxuries," and "conveniences," agrarian civilization is on the short end. Roads will correct this imbalance by connecting the farmer with the markets. "They have no vent for their produce at home," the congressman said. He concluded his speech with an appeal that exposes the heart of the issue:

Such is the fertility of their land that one-half of their time spent in labor is sufficient to produce every article which their farms are capable of yielding, in sufficient quantities for their own consumption, and there is nothing to incite them to produce more.¹²

This is as much as to say that while the Jeffersonian ideal of self-sufficiency is indeed possible on this rich soil, the Hamiltonian ideal of productivity, of success measured by quantity, is more attractive. The farmers, according to this spokesman, preferred agrarian business to agrarian independence. They judged the value of the land by how quickly its products could be converted into cash and

¹¹Quoted in Goodrich, "National Planning of Internal Improvements," Pol Sci Q, Vol. 63 (1948), p. 24.

¹²Ibid.

conveniences. Roads, then, would lead the farmer into the city, where, it seems, his aspirations lay.

Roads had another commercial function besides shortening distances to the market. They intensified the speculative spirit which Jefferson deplored. For example, one very effective argument for local improvements in rural areas was that they would increase the cash value of nearby lands, thus providing a sudden windfall for farmers anxious to speculate. As Richard Hofstadter has pointed out, farmers in the Jacksonian period behaved as though they were more attached to land values than to the land itself.¹³ Mobility was quite common; it was a prevailing hope that a new land bubble further west might mean a personal fortune. Transportation, in effect, meant a double opportunity, a fast killing on increased land values, and a fast get-away.

II

The get-away also had more noble meanings. Roads implied a quickened escape from the past into the future. When the first admirers of Brooklyn Bridge hailed it as the threshold to a glorious future, an entire movement of thought echoed in their shouts. Internal improvements moved in the mind as well as on the land. The movement embodied a fundamental American tenant that a providential geography had created a unique destiny for America, a

¹³The Age of Reform (New York, Vintage Books, 1960), p. 41.

destiny which moved men to possess the land through roads, canals, railroads, and bridges. Also, internal improvements reinforced the popular notion in the 1840's and 1850's that in America, history began anew. The idea that America would redeem the human race was as old as John Winthrop. But, where in his mind stood the will of God, in the mind of most nineteenth century Americans stood the will of man, expressed in the ruthless certainty of machines. Of course, the notion that man's will is supreme is a common one in an age of science, and it was strong in other countries as well. But while in England, industrialism led to a celebration of human knowledge and scientific method,¹⁴ in America it led to an even more rapt celebration of America itself and her historic destiny. The work of engineers dramatized Jefferson's geographical particularism. Their works seemed to further the glorious theme of American separation from the European past. If geography initially removed America from Europe and from history, then internal improvements made that removal more secure. Thus, technology promised a "new dispensation."¹⁵

¹⁴See Francis D. Klingender, "Under the Banner of Science," Art and the Industrial Revolution (London, 1947), ch. 2.

¹⁵This expression was used by Edward H. Knight in "Mechanical Progress," The First Century of the Republic (New York, 1876), a collection of review essays put out by Harper's.

In particular the excitement of internal improvements gave new life to a theme as old as Columbus, of a "passage to India." This theme, we shall see, inspired John Roebling, the builder of Brooklyn Bridge. Through Whitman, it also inspired Hart Crane. Whitman's poem, then, is a likely stop en route to the bridge, Brooklyn's and Hart Crane's. Whitman's ideas regarding America developed in the most intense period of internal improvements, the three decades before the Civil War. His ideals came out of Jacksonian America. Now, in 1870, he faced the new world the engineers had made; the major connecting works were completed. Whitman faced this world, to be sure, with his old beliefs intact. He wrote:

A worship new I sing

You captains, voyagers, explorers, yours,

You engineers, you architects, machinists, yours,

You, not for trade or transportation only,

But in God's name, and for thy sake O soul.¹⁶

He wrote that the first century of American history "was no common century." Without precedent, "it may be said to have leaped into existence." The key factor in the newness, he pointed out, was machinery. "It was as if by a mysterious impulse all started at once, the utilization of buried stores of coals by means of the Watt engine being the great fact of the new dispensation," (p. 40).

¹⁶Leaves of Grass and Selected Prose, ed. Sculley Bradley (New York, Rinehart Edition, 1951), p. 340. Page references in the text are to this edition.

In this poem, technology is the cause of the "new worship." But the worship itself is not of the machine or the engineer. Rather, the religious end of technology is "the soul," in which all men and all time are united. The ideal, in other words, is much the same as in Whitman's poetry of the 1850's, and indeed, the means, though technological, are still embodied in a symbolic passage. "Passage to India" differs from "Crossing Brooklyn Ferry" (1856), however, in that the passage is smoother, less afflicted with doubts, and moves ineluctably in one direction; in the earlier poem, not the destination but the constant process of passage, of flux, keeps the poet in the "float" of time. In the first poem, the experience is personal and immediate; in the second, it is generic and abstract.

The occasion of "Passage to India" is the completion of three specific technological achievements, the Suez Canal, the Atlantic Cable, and the continental railroad. These were great events in transportation and communication, and Whitman siezes upon the fact that through time, the world is literally spanned. The most important effect of the spanning work of the engineers is that it defines the circuit of the world. With the "rondure of the world at last accomplished," now the mind can follow suit. By connecting East and West, the engineers have connected past and present; the peoples and ideas and customs of Asia, Europe, and America can

now mingle freely. In sections 2, 3, and 4, the passage is mainly spatial - across the waters and over the mountains. In section 5, after the "rondure" has been accomplished, the passage changes, becomes temporal. With the spatial journey completed, the poet says to the earth, the "vast Rondure, swimming in space," that "Now first it seems my thought begins to span thee." The engineers have shown him the earth in a cosmic perspective. He sees in the light and darkness, the grass and water, an "inscrutable purpose, some hidden prophetic intention." This prophecy resides in the past, which becomes a major dimension of the poem. Spanning the earth in thought, the poet sees "Adam and Eve appear, then their myriad progeny after them." These figures are wandering, unhappy, baffled with "restless explorations." Their "sad incessant refrain" is "Wherefore unsatisfied soul?" and "Wither O mocking life?" The argument of this section is that the "sad incessant refrain" of the past comes from man's sense of separation from nature.

. . . what is this separate Nature so unnatural?

What is this earth to our affections? (unloving earth,

without a throb to answer ours,

Cold earth, the place of graves.) (p. 342)

Now, through the cables and railroads, the separation will be closed. It will happen, however, not through the engineers, but the poet. After

the work of the scientists, Whitman promises, "The true son of God will come singing his songs." His songs will not only justify the modern works, but they will soothe the yearning hearts of man, they will tell the secret purport of nature.

All these separations and gaps shall be taken up and
hook'd and link'd together,

The whole earth, this cold, impassive, voiceless earth,
shall be completely justified. . .

Nature and Man shall be disjoin'd and diffused no more,

The true son of God shall absolutely fuse them. (pp. 342-343)

The argument of section 5 is, in other words, that technology has prepared the world for the arrival of the true poet, who in turn will lead mankind back to the natural harmony of Eden. In section 7 the poet proclaims, "Passage indeed O soul to primal thought. . . To realms of budding bibles." He urges his soul to begin the journey, the "mind's return, / To reason's early paradise, / Back, back to wisdom's birth, to innocent intuitions, / Again with fair creation" (p. 344). This passage is the soul's, not the machine's. But without the machine's work, the soul would still be moored. In short, the machine restores the Garden.

Whitman's "passage to more than India" is a passage to the shores of "ye aged fierce enigmas!" It is a journey back to the

simplest secrets of nature, of earth and sky, "Of you O waters of the sea! O winding creeks and rivers!"

O morning red! O clouds! O rain and snows!

O day and night, passage to you! (p. 347)

It is a journey undertaken with confidence, for, as Whitman tells us in the beautiful prayer to the soul in section 8 ("O Thou transcendent, / Nameless, the fibre and the breath. . ."), he feels within himself powers equal to the profoundest discoveries of science.

How should I think, how breathe a single breath, how speak,
if out of myself,

I could not launch, to those, superior universes? (p. 345)

He has "silent thoughts" of Time, Space, and Death, and he shrivels at the thought of God. But he turns to his soul, his "actual" self,

And lo, thou gently masterest the orbs,

Thou mateest Time, smilest content at Death,

And fillest, swellest full the vastnesses of Space. (p. 346)

Technology, then, does not threaten Whitman; it has, in fact, released the deepest energies of his soul. It has restored him to the past, and prepared him for the future. He is ready for more: "O farther, farther, farther sail!"

Whitman's confidence about technology creates ambiguous

feelings in twentieth century readers of this poem. We generally take all nineteenth century optimism to be superficial. But there are two separate points of view we should take toward "Passage to India." On the one hand, Whitman's perception that technology introduces a new phase of human history, one in which all traditional explanations of man and nature are up for re-examination, is a sound one. Technology has indeed confronted us with the "ancient fierce enigmas." On the other hand, Whitman's own fierce insistence upon harmony, upon a restoration of the "innocent intuitions" of Eden, points to a current of feeling that never becomes explicit in the poem. The insistence upon harmony and a return to the Garden, it seems to me, registers subtle dislocations which technology caused in the nineteenth century, especially in America. American society to begin with felt itself unique in history, and furthermore, felt that the harmony with nature promised by geography would protect that uniqueness. Technology seemed to hasten that process. On a popular level, this resulted in exultation at the wonders of machinery and the "new dispensation." On a more sophisticated level, it resulted in more searching criticism. Consider, for example, Hawthorne's treatment of the flight of Hepzibah and Clifford in The House of Seven Gables. The two "time-stricken" innocents, flying along in a railroad car, feel that

"everything was unfixed from its age-long rest, and moving at a whirlwind speed in a direction opposite to their own."¹⁷ This unfixed condition is perilous for a sense of continuity in time, not to speak of harmony with nature. Whitman does not permit such dislocations to take hold of his world in "Passage to India." Yet, the very fact that, on the one hand, he fails to mention them while on the other hand, he evokes the exact anodyne to them, the image of pastoral harmony, suggests an underground response. In the poem, the machine is harmless; it serves man by opening a path to nature. What Whitman failed to consider, except covertly, was that the engineer could not open that path without first taking an attitude toward nature that would, at the very least, postpone the "passage to more than India" a good while.

III

If American society in general, and Hart Crane in particular, were to enlist in Whitman's voyage, they were bound for rough

¹⁷The Complete Novels and Selected Tales of Nathaniel Hawthorne, ed. Norman Holmes Pearson (New York, Modern Library, 1937), p. 397. For an excellent account of Hawthorne's response to the technological invasion of the landscape, see Leo Marx, "The Machine in the Garden," New England Quarterly, XXIX (March, 1956), pp. 129-146. See also, by the same author, "Two Kingdoms of Force," Massachusetts Review, I (October, 1959), pp. 62-96. Those familiar with Mr. Marx's work will recognize how indebted I am to his formulations.

waters. Jefferson and Whitman both were sanguine about roads because they believed that larger values prevailed. As long as the roads seemed to serve a larger ideal, then it was possible to believe that the bridge in fact led to a future that was nothing more than a brighter and better past. But the values did not hold, and in the end, neither did the bridge. Hart Crane had to strain to make a traffic bridge a threshold of eternity, and the strain itself is a sign that the fact made trouble for the symbol.

The new dispensation of technology seemed quite in keeping with the old ideals of national destiny. Even Emerson, in a lecture in 1844, "The Young American,"¹⁸ was confident that internal improvements were "beneficent for America." The railroad, he felt, would bring Americans closer to the land (he was addressing an urban audience and deplored the movement of young people into the cities). He said that technology was quite consistent with the traditional values of the land; the railroad, in fact, was a "magician's rod" which would plant a garden in the West. He drew a fetching picture of European public gardens, lamented the absence of that art in America, but hoped that the vast technological changes would somehow bring it about. To be sure, Emerson's confidence, like Whitman's, betrays an undercurrent of fear and anxiety about the

¹⁸English Traits and Other Essays (Everyman's Library, 1951), pp. 358-374.

uncontrolled effects of technology, but nevertheless, his public remarks remained confident.

But what, meanwhile, were the engineers thinking? Their thoughts are instructive. Thomas Ewbank is an excellent example. Ewbank was perhaps our first full-fledged technocrat. As Commissioner of Patents, he attached to his report of 1849 an essay in which he spread before Congress the prospect of "an infinity of work" for Americans. Man's original sin, he wrote, was indolence. But man's work would not be finished until "the planet is wholly changed from its natural wilderness as a harbor for untamed intelligences - noxious reptiles, into a fit theatre for cultivated intelligences."¹⁹ For Ewbank, all other activities were besides the point; technology was all the poetry and morality man needed:

A steamer is a mightier epic than the Iliad; and Whittemore, Jacquard, and Blanchard, might laugh even Virgil, and Milton, and Tasse to scorn.

A lever, hammer, pulley, wedge, and screw, are actual representations of great natural truths, and the men who revealed them may be said to have been inspired.²⁰

Through mechanics, Ewbank saw "PERPETUAL PROGRESS." Engineers and inventors held "the future destinies of the planet in their hands."²¹ In a longer work, The World a Workshop, Ewbank

¹⁹31st Cong., 1 Sess., "Report of the Commissioner of Patents," Part I, House of Representatives, Executive Documents, No. 20 (Washington, 1849), p. 486.

²⁰Ibid., p. 488.

²¹Ibid., p. 493.



showed that the engineer and inventor was the archetypal man. Not because he opens a path to nature, but because he exploits nature. Man is a "MANIPULATOR OF MATTER." This view of man as the universe's chief tool-maker, after God himself, brings to the surface some of the implications of technology which seem to have escaped Whitman and Emerson.

Ewbank's ideas are an outgrowth of eighteenth century empiricism and deism. He sees the world as an immense mechanism. Man followed nature best when he manipulated nature mechanically, when he rearranged nature into new and practical combinations. Thus, the engineer-inventor stood at the center of all generically human activity; he was the focal point of all energy that was distinctly man's. Urging unhindered assault upon natural resources, Ewbank said, in regard to agrarianism, that "the hypothesis that the chief employment of man was to till the soil and raise cattle, is an unworthy one."²² He argued that food is a mere adjunct to life, not the real thing itself. The genuine treasures were underground. The agrarians are therefore "surface dreamers."

Ewbank was dedicated only to improvement and progress. He did not claim that the engineer serves "manifest destiny," or any nationalistic motive. He served inorganic matter, pure and simple.

²²The World a Workshop (New York, 1855), p. 22.

Nevertheless, Ewbank could not resist the impact of the West; he imagined the plains filled with busy people. It was hardly an empire of free-holders he foresaw; in fact, his vision was pointedly anti-free-holder. In the following passage, which has to be quoted in full to show its impact, Ewbank puts the case as directly and as powerfully as possible.

For what classes then chiefly was the world of inorganic matter provided? Observe that dwelling; it belongs to a family neither rich nor poor; neat, commodious, and attractive in itself; it has a garden in front, an orchard and corn-field behind. Mark the social enjoyments, intelligence, and contentment of its inmates; the abundance of necessaries, of comforts and conveniences; the ornaments and elegances in dress and furniture, with contributions from almost every productive and decorative art.

But, hark! a train of cars is approaching. It stops one moment and starts the next with a shriek for the city, whirling us along level and undulating lands, through tunnelled mountains, over rivers on bridges of granite, and others of iron. In the quick-moving panorama arise before us, and in a moment pass by, brick and lime kilns; potteries; tanneries; machine shops, chair, cloth, and carpet factories. We come in sight of a bay, on which ships laden with foreign merchandise are floating in with the tide, and others with home manufactures passing out. Crossing over in a steamer we find an extensive border of leafless forest resolved into masts of vessels crowded into continuous docks, and on landing, feel the air rent and agitated, like rippled water, with the noise of stevedores and draymen. We have business to transact for a friend, and pick our way along the sidewalks, among packing cases of dry-goods, casks of hardware, bundles of sheet and hoop iron, and loads of other goods. Next we stop at a telegraph office, and in five minutes our friend, though five hundred miles distant, receives and answers our note. On leaving the street of

the merchants for others occupied by watchmakers, jewellers, opticians, philosophical and musical instrument makers, engravers and printers, we call at a newspaper office to insert an advertisement and order the daily sheet for a neighbor. Need we proceed? It was for men who bring such things out of inert matter that this world of matter was made.²³

This is surely a daring piece of writing. Two core images, rural and urban, are set plainly against each other, each portrayed in its essential tone and speed. The contrast leaves no doubt about the issue. The engineer-inventor has made what Americans recognized as their civilization. The rural image is presented quite fairly; it is not subverted by ridicule. In fact, its most attractive features, its organic way of life, are described accurately, even nostalgically. But, it is simply overwhelmed. It remains a quiescent dream of peace and self-sufficiency, a neatly-arranged, humane and orderly relation to nature. It makes the mistake, however, of attaching itself to the wrong nature, to that which is fertile, growing, vegetable. How unimportant and backward this seems next to the urban world of inorganic matter. This surely is the world that counts. This defines reality in America; the other is an ancient dream.

In Ewbank's vision, roads serve commerce, they serve progress; they stand for movement. Between Jefferson and Ewbank

²³Ibid., p. 23.

lies a crucial chapter in American culture; they represent opposite values about the same things. Such a contrast adds weight to Richard Hofstadter's comment that "America was born in the country and grew up in the city." Judging by what Americans expressed in the face of the new technology in the middle years of the nineteenth century, it appears that the nation was caught in a conflict between images of its origin and images of its future. In the past lay the land; in the future, the Machine. But the past, in spite of its continual attraction, was powerless before the Machine. What in the way of actual institutions did the birth in the country create for the youth in the city? Emerson's image of pastoral felicity was a European image, the aristocratic public garden. Jefferson's "noble husbandman" was by and large an imaginative defense against the urban industrialism he had seen in Europe, rather than a live figure in America. The local attachments to the soil which Jefferson relied upon simply did not develop to any significant degree. Not the land or the garden or the soul, but the road - from the first national turnpike initiated by Jefferson to the latest super-highway - has expressed the essentials of American life.

No matter how persistently the dream of a tenderly-cultivated plot has attracted Americans, their actual behavior toward the land was something else again. This was true even before the engineers began their measurements and their tunnellings. It was true from the very beginning, when the sight of the untamed wilderness going to waste converted the transplanted Europeans into Americans. As Francis Grund shrewdly observed in 1837, Americans had always

treated nature as a conquered subject; not as a mother who gave them birth. They were the children of another world, who came thither to burn, ransack and destroy, and not to preserve what they found. They burned the forests, dug up the bowels of the earth, diverted rivers from their course, or united them at their pleasure; and annihilated the distances which separated the North from the South, and the East from the West.²⁴

And they did this so well and so rapidly, Grund wrote, that no single change seemed permanent; Americans, he wrote, "live in the future, and make their country as they go on."²⁵ To many Americans, the "going" itself has seemed the main business of man on a wild continent throbbing to be subdued. Appropriately enough, then, The Great Bridge, which of all technological artifacts in the nineteenth century seemed the most permanent (it was compared to the Pyramids), was an object whose chief purpose was to make the going back and forth across a river easier and quicker.

²⁴ Francis Grund, The Americans (Boston, 1837), p. 317.

²⁵ Ibid., p. 151.

PART I

BROOKLYN BRIDGE: SOURCES

CHAPTER II

THE RAINBOW AND THE GRID: A TRADITION FOR BROOKLYN BRIDGE

What is the path from earth to heaven?

Foolishly do you now ask. Have you not been told that the gods made a bridge from earth to heaven, which is called Bifrost? You must have seen it. It may be that you call it the rainbow. It has three colors, is very strong, and is made with more craft and skill than other structures. Still, however strong it is, it will break when the sons of Muspel come to ride over it, and then they will have to swim their horses over great rivers in order to get on.

The Younger Edda

The conditions which produced Brooklyn Bridge were quite down to earth. They included both a scientific and a social readiness for the act of erecting, over a period of thirteen years, a major traffic highway between two large urban centers. Empirical construction techniques, along with chemical and physical stress analysis, had to be sufficiently refined for such a project. Industry had to be prepared to supply the tools and materials, which included the new material of steel. Then too, there had to be a sufficient need for such a continuous highway for pedestrians and mechanical traffic between Manhattan and Brooklyn, and furthermore, a

recognition of that need by the powers capable of financing and administrating such a large-scale project. All of these conditions existed; the very fact of the bridge implies that they existed. The bridge, as it were, stands for the state of engineering science, the growth of population and commerce, and the ability of administrators. As an artifact, it implicitly characterizes the abilities and the resources of its creators.

But Brooklyn Bridge is more than just a common artifact. It has had a special existence in the minds of many Americans, an existence quite separate from its existence as an actual traffic bridge. In fact, the idea of a bridge between Manhattan and Brooklyn was itself a condition which helped create the bridge, not only as a fact but also as a symbol within American culture. A bridge across the East River was discussed by New Yorkers long before either the technical possibility or the need for such a bridge was ripe. The significance of the early proposals, moreover, is that they projected not simply a bridge, but a monumental bridge; it would be a structure to celebrate the city and the nation. The scope and daring of the project itself assumed that any bridge capable of overcoming the geographical obstacles of the setting would have to be majestic. As a matter of fact, the elevated tone of the early projectors of a Brooklyn Bridge probably sounded forbidding to the cautious business interests who would have had to

underwrite the venture. A bridge large enough and strong enough to connect the two floating masses of land and rock of Manhattan and Long Island was frequently dismissed as a fantastic impossibility.

Roebling's report in 1867, which contains his final plans for the bridge, lies directly within the brief tradition of more than a half century of proposals for such a connecting span. His report, as I shall show, was carefully designed to weaken the resistance among the commercial interests of the cities to a project of this scale. In his report, the idea of Brooklyn Bridge merges with the tangible conditions of technology and economics, and the bridge begins its career as a fact. The idea, however, with its overtones of national symbolism, has persistently accompanied that fact. To define the reality of Brooklyn Bridge within American life, it is necessary to reconstruct the main features of the tradition which lay behind Roebling's own report.

I

Writing in his journal before 1800, General Jeremiah Johnson of Brooklyn noted that "a gentleman of acknowledged ability and good sense" had proposed to erect a bridge across the East River in less than two years. General Johnson himself felt that the project had some sense, but wrote that "the idea has been treated

as chimerical from the very magnitude of the design."¹ Nothing more is known about this "chimerical" plan, but the tone of General Johnson's remark is revealing. The "magnitude" of the undertaking gave it a visionary aspect; it would require a bold, imaginative, and dedicated builder. If such a bridge would ever arise, it would necessarily be through a monumental feat of design. Here indeed was a challenge, not only to American technology, but to American patriotism; through a project of this sort, the new energies of the young nation could show themselves to the world. To span the East River would be more than a physical act; it would be symbolic of national destiny.

It is not surprising, therefore, that the first significant proposal for a Brooklyn Bridge, made in 1811, should have precisely this lofty tone. The proposal was made by a New Yorker, Thomas Pope, in A Treatise on Bridge Architecture, the first serious study of the bridge as an architectural form to appear in America.² Pope

¹Quoted in D. B. Steinman, The Builders of the Bridge (New York, 1945), p. 297. Also see Harold Coffin Syrett, The City of Brooklyn, 1865-1898, Columbia University Studies in History, Economics and Public Law, No. 512 (New York, 1944), p. 146.

²The full title is, A Treatise on Bridge Architecture: in which the superior advantages of the Flying Pendant Lever Bridge are fully proved. (New York, Alexander Niven, 1811). All page references are in this edition.

draws from history, geography, and science to argue for his bridge. His Treatise formally initiates the tradition which culminates in Roebling's argument, 56 years later.

This fact is all the more interesting when we recognize that Pope himself is part of a larger, European tradition. A child of the Enlightenment, Pope speaks an eighteenth century language, and like his more famous namesake, he speaks frequently in rhymes. For a title-page epigraph he writes:

Exulting Science now disdains
The ties of custom's proud controul,
And breaks the rude and barbarous chains
That fetter'd down the free-born soul.

Science for Thomas Pope, as for Franklin, Jefferson, and Tom Paine, was a matter of experiment and invention along with a study of abstract principles. Like Jefferson, Pope respected "the ancients," but respected "experience" even more. In a study of the past, he points out in his preface, we can discover "those fundamental rules which have, in later times, governed the improvement of every age," but we cannot find the exact answers to the problems of the present. There is no standard, no preceptor except "experience," "whereby to resolve or proportionate the formation

of any article of convenience, that man by his necessity might be led to contrive" (pp. ix-x). The practical builders are the true men of science; the academicians are "unskilled pretenders."

There is nothing distinctly American about Pope's ideas of science. They were prevalent throughout western Europe in the last half of the eighteenth century, when applied science was making great advances. The work of men like Perronet in France, and Rennie and Telford in England, demonstrated that the new age of steam required a fruitful marriage between theory and practise, between architecture and engineering. But in advocating that such a marriage take place in America as well, Pope does in fact adduce reasons derived from America's unique historical and geographical conditions. For example, much like Horatio Greenough in the next generation, he criticises the Georgian style of public architecture on behalf of a native vernacular style. Arguing for a functional approach to public buildings, he writes:

Hence we witness, in cities making no small pretensions to pre-eminence, huge costly piles intended for public use, some of which are divided and subdivided in the internal parts, like unto a printer's type case, with scarce one room suitably arranged or proportioned either to the size of the building, or the requisites thereof; as though it were indispensibly necessary that all public edifices, for whatever purpose designed, should be erected on the plan of an asylum for lunatics. (p. xiv)

As for exterior facades, "we have the painful mortification to witness the whole of an extended front, though built with marble,

crowded with glaring absurdities from one end to the other." This situation, he argues, ill bespeaks "the wisdom, grandeur and correct taste of a great nation." (p. xxi) Pope blames this situation on the academic imitators, the "gentlemen of the gown," "those flimsy pretenders to Science, and enemies to the useful Arts, who now strut about like so many crows dressed in a few borrowed plumes, which only serve to make their deformity more conspicuous." (p. xxii) His solution, which he promises would greatly benefit the nation, is "a combination formed of ingenious mechanics and learned mathematicians." Interestingly, although a man of obvious learning, he refers to himself as a landscape gardener and architect, a craftsman rather than a scholar or historian. Likewise, the list of subscribers to his Treatise consists mainly of New York masons, carpenters, stone cutters, ship-wrights, and merchants, although the professional and educated classes are also represented by the notable names of Governor Daniel D. Tompkins, Lieutenant Governor DeWitt Clinton, James Renwick, Robert R. Livingston, the President of the New York American Academy of Arts, and several faculty members of Columbia College.

Pope's main concern, however, is bridges, and in this connection, his Treatise is a preface to the leading motifs of the internal improvement period about to begin. Written in four parts,

the study consists of a historical account of the development of bridges, a description of Pope's own patented invention, a cantilever "Flying Pendant Lever Bridge," a pioneering appraisal of the structural possibilities of native materials, like timber, stone, brick, and iron, and an extraordinary conclusion, a verse essay of 210 lines of heroic couplets repeating his proposal made in an earlier section, for a model bridge in New York. On the eve of the nation's first period of technological change, in other words, Pope, arguing for a vernacular approach to building, enlists history, invention, and science in America's campaign to master the continent.

Although Pope's historical account of "sundry bridges" is thoroughly objective, and indeed, comprehensive enough to remain even today a major source of information, it serves the role in the Treatise of suggesting a special destiny for America. In America, the history of bridges, Pope implies, will reach a new phase. Here, geography has determined that the existence of the nation itself must be based on bridges. Consider, for example, this passage from the conclusion of the historical section, in which familiar arguments about the geographical necessity for technological expansion are applied directly to bridges.

It is a notorious fact that there is no country in the world which is more in need of good and permanent Bridges than the United States of America. Extended

along an immense line of coast on which abound rivers, creeks, and swamps, it is impossible that any physical union of the country can really take place until the labours of the architect and mechanic shall have perfectly done away with the inconvenience arising from the intervention of the waters.

If nature has created the problem, however, so has it provided for a solution, in the abundance of natural resources on the continent.

Our forests teem with the choicest timber; and our floods can bear it on their capacious bosoms to the requisite points. Public spirit alone is wanting to make us the greatest nation on earth; and there is nothing more essential to the establishment of that greatness than the building of Bridges, the digging of canals, and the making of sound turn-pike roads. (p. 127)

This argument leads Pope directly into a "mathematical description" of his own invention, a prefabricated timber bridge which can be mass produced and assembled without difficulty on the building site. Using the classical method of his masters, Archimedes, Galileo and Newton, Pope demonstrates through axioms and deductions the practicality of his vision. Furthermore, the mathematical nature of the plan, together with the reliance upon native timber, meant that the "flying pendent lever bridge" was universally applicable in America. He proposes this bridge as a national form, a structural analogy, as it were, to the universal principles of the Declaration of Independence.

The bridge itself was a very flat arch, consisting of twin cantilevers, joined at the center, and stiffened with a diagonal

bracing. The two cantilever arms were actually a series of longitudinal ribs constructed into a solid girder, and covered with a diagonal sheathing. Pope asserted that such a structure could be extended 3000 feet across the Hudson River; if the principles were mathematically sound, he felt, only the strength of the material would limit the size of the span. In another section of the Treatise, Pope describes a 94 foot model of a "flying pendent lever bridge," or, as it came to be known, the "rainbow bridge," which he exhibited as a proposed East River bridge. He included testimony by a group of New York shipwrights about the soundness of the plans. The "rainbow bridge" was to soar 1800 feet from shore to shore, 223 feet above high water - dimensions which exceed even Roebling's final bridge.

Pope did not design his bridge to fit any specific place; it was an invention in the broadest meaning, a contrivance which could be used wherever a bridge was needed. In this sense it can be spoken of as a "pure" bridge, a formal principle. This made its national significance all the more dramatic for Pope. His bridge represented the "free-born soul" which "breaks the rude and barbarous chains" of academic tradition. For Pope, the bridge was surely a symbol of America itself.

In the long poem which serves as his conclusion, Pope writes:

Let the broad arc the spacious HUDSON stride,
 And span COLUMBIA'S rivers far more wide;
 Convince the world AMERICA begins
 To foster Arts, the ancient work of kings.³

The poem is a plea for the chance to build one model bridge (in this case, over the Hudson River, which has the double virtue of being wider than the East River, and of fitting the metrical pattern of the line), to demonstrate that the principle is workable and relevant to America's historical heritage of carrying further the arts of civilization. The very boldness of the plan, Pope thought, was its most characteristic feature.

Stupendous plan! which none before e'er found,
 That half an arc should stand upon the ground. . .
 Like half a rainbow rising on the shore,
 While its twin partner spans the semi o'er,
 And makes a perfect whole, that need not part,
 Till time has furnished us a nobler art.

About half of the poem describes the technical aspects of the bridge, the "simple rules" upon which this self-evident structure is based. The rest of the poem is taken up with a dialogue between the author and a sceptic, who wonders "how to reconcile those novel truths/

³The lines quoted from this poem are found on pp. 281-288.

With what the Doctors teach their college youths." The poet argues on behalf of experimental science and freedom against those "fools" who teach "That nothing strange or new can e'er be brought, / But what in ancient times were known or wrought." Pope casts himself and his bridge in the role of defenders of truth and scientific discovery against ignorance and superstition.

Yet, science has her sons in every age,
 Her babes of skill, her striplings, and the sage,
 And daughters too, on which her hand bestows
 Sublime discernments, that no stranger knows;
 Though bastards oft intrude and steal the bread
 With which the sons of merit should be fed,
 Array themselves in ep'lettes, swords and gowns,
 And strut about like showmen's drest-up hounds;
 And if you ask them a new work to view,
 "Oh, sir," say they, "it never can be true;
 "Besides, I have no time to spare, to look
 "At schemes like these; they're not within my book."

Thomas Pope did not get his chance to build his bridge, but perhaps his poem was enough to plant the seed. At any rate, although his structural principles were sound enough and were used in later cantilever bridges, either the Hudson or the East River would have overcome his wooden members; the rainbow would have

collapsed of insufficient weight. This weakness, however, is less important than the vision itself, a bridge in America's leading city as a symbol of America itself. Illustrated in the Treatise (Figure 1), the Hudson River version of the "rainbow bridge" is a flat, graceful arch, made of two gently tapering arms connected in the center. Almost futuristic in appearance, it has two spire-like towers flanking the New York abutment, with no structural purpose but to be sentinels to the city. The bridge resembles no conventional bridge forms, although the slender, tapered arms of the arch do call to mind the delicate cast-iron arch which Thomas Telford designed to replace London Bridge in 1801, or the thin, stark lines of Maillart's reinforced concrete arches in Switzerland. Pope, to be sure, was a functionalist in a very extreme sense; he seems to have been concerned exclusively with the form of his bridge, with its fitness and its "mechanical beauty," rather than its actual service as an urban bridge. He never bothered to describe the roadway, for instance, or the kind of traffic the span could handle best. It was a pure structural form, an ideal possibility for America to use in its building program. To "cultivate its growth," as Pope writes in the last line of his poem, would be a noble act; it would be a tribute to science and art, and to America for fostering both.

II

A better sign than Thomas Pope's vision of what America

was actually fostering in 1811, is the report of a New York commission appointed four years earlier to work out "improvements touching the layout of streets and roads in the City of New York." This report established the familiar gridiron street plan for Manhattan, a plan which, according to one historian, "marks the division between old and modern New York."⁴ If Pope's vision belonged to the eighteenth century, then the commissioners' report, whose sole concern was efficiency, belonged to the nineteenth; together they make a nice contrast in values. But more important than that, both events, the rainbow and the grid, are critical parts of what I have been calling the tradition of Brooklyn Bridge. Each contributed, in its own way, to the final product of that tradition, the bridge itself.

The gridiron plan of 1811 has been roundly blamed in the twentieth century for many of the unpleasant features of modern Manhattan, the narrow east-west streets, the congestion, and especially, the unimproved condition of riverside areas. The plan became a vise, restricting the chances for large-scale horizontal planning along natural contours, and forcing the irregular vertical growth of tall buildings. In the strict sense of the term, it was not

⁴I. N. Phelps Stokes, The Iconography of Manhattan Island, 1498-1909 (New York, 1918), III, p. 478.

a city plan at all; it did not plan for the orderly arrangement of streets and open spaces in relation to buildings. Compared to L'Enfant's plan for Washington, the New York plan was simply a street map; it was a surveyor's model of applied rectangular logic. One modern planner has compared it with a drainage system.⁵

It is interesting to compare the style of the 1811 plan with the style of Pope's "rainbow bridge." The gridiron had its own touch of grace, as one might put it, in being totally devoid of any pretension to art or beauty; it was a "pure" application of geometry, with the only intention of subdividing the land and laying out street routes. Unlike Pope, the commissioners were unmoved by thoughts of national grandeur; their motive was avowedly commercial and utilitarian. Explaining their choice of the gridiron pattern, they wrote that they had considered "whether they should confine themselves to rectilinear and rectangular streets, or whether they should adopt some of those supposed improvements, by circles, ovals and stars, which certainly embellish a plan, whatever may be their effects as to convenience and utility."⁶ Embellishment was

⁵Thomas Adams, Harold M. Lewis, Lawrence M. Orton, The Building of the City, Regional Plan of New York and its Environs, Vol. II (New York, 1931), p. 51.

⁶Quoted in Christopher Tunnard and Henry Hope Reed, American Skyline (New York, Mentor Book, 1956), p. 57.

so far from their purpose that a tone of disdain appears in their use of the term.

The commissioners made their assumptions quite clear; utility meant nothing more or less than a straight line between any two points. Speaking of themselves in the third person, they wrote:

In considering that subject, they could not but bear in mind that a city is to be composed of the habitations of men, and that strait sided and right angled houses are the most cheap to build, and the most convenient to live in. The effect of these plain and simple reflections was decisive.⁷

Likewise, economy defines itself as a matter of the cash value of land, rather than any other salutary values - the disposal rather than the use of land.

Those large arms of the sea which embrace Manhattan Island, render its situation, in regard to health and pleasure, as well as to convenience of commerce, peculiarly felicitous; when therefore, from the same causes, the price of land is so uncommonly great, it seemed proper to admit the principles of economy to greater influence, than might under circumstances of a different kind, have consisted with the dictates of prudence and the sense of duty.⁸

The very same geography which moved Thomas Pope to dream of a rainbow, becomes an excuse to surrender "prudence" and a "sense of duty" to the demands of commercial efficiency.

⁷Ibid.

⁸Quoted in Stokes, p. 478.

The peculiar style of the 1811 plan, then, is precisely this, its unrelenting adherence to the single motive of efficiency. This was an unambiguous affair; the landscape had to be subdued, not for the sake of achieving a harmonious life between man and nature, but for the sake of the orderly development of a commercial city, whose single unit was not the private building lot. A modern city was to be imposed upon the island; nature itself was permitted no role in saying how that city should grow and organize itself. As an exasperated critic of the plan wrote in a pamphlet in 1818, the gridiron platte simply ignored the changing levels of land; only the courses, widths and lengths of the street were designated, and the land was expected to surrender its individuality to the platte. The city, this irate citizen wrote, seems

resolved to spare nothing that bears the semblance of a rising ground. . . These are men, as has been well observed, who would have cut down the seven hills of Rome, on which are erected her triumphant monuments of beauty and magnificence and have thrown them into the Tyber or the Pomptine marshes.⁹

The land, it appears, was a hindrance in the minds of the commissioners; it had, in effect, to be eliminated.

But how did the gridiron plan serve the city? Mainly, as a means of earning public revenue. Late in the seventeenth century, the city corporation had been the leading land-owner on Manhattan

⁹Quoted in ibid., p. 482.

Island. Land, in fact, was the corporation's major source of revenue, through taxes. The easiest way to raise large sums of money for public projects, such as swamp reclamation, was either to lease or sell packages of the land.¹⁰ In the eighteenth century, both methods were used; long term leases were issued with the expectation that improvements upon the land would increase values, and therefore rents and taxes. The city continued this practise throughout the eighteenth century, employing no over-all plan for the disposal of lands, either through outright sales or through long-term leases. At the beginning of the nineteenth century, the island had scattered lots at odd points across the land, most of which was still wilderness. At this point, as one historian writes, "New streets were needed to serve the land already sold and to open up the common land still in city ownership."¹¹ In 1807, the legislature authorized the commission which produced the plan of 1811, to design an efficient method of expediting the further sale and exploitation of the land for public revenue, as well as to encourage private building, to increase the tax value of existing lots.

The plan of 1811, in short, was a critical event in the process of the passing of ownership of the island from public to private hands. After 1811, municipal ownership and the leasehold

¹⁰See Cleveland Rodgers, "The City as Landlord," New York Plans for the Future (New York, 1943), pp. 34-53.

¹¹Ibid., p. 42.

system were on the way out, and the real-estate speculator, of which John Jacob Astor became the prototype in the 1820's, took over control of the city's land. In 1844, to settle an enormous public debt, the city finally disposed by auction of what remained of its original heritage of common land.

One of the major consequences of the 1811 plan and the subsequent sale of the common lands, was the city's surrender of centralized control of planning and building on the island. This handing over of the control of city development into the hands of private investors affected all future building in the city, including Brooklyn Bridge. As the Regional Plan of 1931 put it, the division of the land into saleable packages made individual profit rather than "architectural control in the interests of the community" the decisive factor in the city's growth and appearance.¹² One specific instance of this surrender implied by the gridiron plan is that it eliminated the possibility of the carefully controlled residential square, in the London manner; another is that it eliminated the chance for residential development of water front lands, one of the most blatant of missed opportunities of New York planning.

The case of Trinity Church is typical. Through the course

¹²Adams, p. 50.

of the eighteenth century, the church had acquired a group of farms which it converted into 99 year leaseholds, thus keeping a measure of control over the development of the property; in 1803, the church created Hudson Square (now the site of the New York entrance to Holland Tunnel), a unique example of English residential planning in America. By the 1820's, however, the church's tenants, in keeping with the speculative spirit of the age, demanded private ownership of the land, and the church gave in. As Tunnard and Reed point out, "The abandonment by New York's Trinity Church of its ninety-nine year lease was a sign of the new age, in which all emphasis was placed on individuality in the development of land and the building of the city."¹³

The unregulated pursuit of real estate profits resulted in a rapid concentration of commercial buildings in the lower end of Manhattan, creating the familiar tangle of closely-packed buildings and sidewalk congestion. These consequences of extreme individualism in New York commercial constructions were already felt in the middle years of the nineteenth century, and, as we shall see, they affected John Roebling's conception of the shape and function of Brooklyn Bridge.

Another consequence of the 1811 plan is less obvious. By

¹³Op. cit., p. 67.

eliminating the chance for comprehensive planning of city development, the plan determined that new building needs would be of a very circumscribed sort; that is, the architectural needs themselves were defined by the limited horizontal space available for commercial structures. Limited space, together with the great danger of costly fires in crowded sections, ruled out the rural New England methods of wood frame construction, and led to the more appropriate iron frame methods of Badger and Bogardus in the 1830's.¹⁴ This in turn began the development toward the indigenous urban form of the steel-skeleton tall building. It is significant that this line of architectural development, based primarily on the internal structure of single narrow buildings, rather than the treatment of spaces wider than the individual lot, should become America's unique contribution to modern architecture. One interesting result of the emphasis upon a uniform internal structure, is that monumentalism in building became a matter of the facade rather than the modeling of exterior space, the arrangement of buildings in relation to each other, and the construction of large building units. The gridiron, for example, prevented the fusion of the separate geniuses of a Bogardus and a Frederick Law Olmstead, to create a zone of buildings

¹⁴Carl W. Condit, American Building Art: The Nineteenth Century (New York, 1960), pp. 30-50.

in relation to nature; instead, Olmstead's Central Park is set aside from the essential life of the city, in its own rectangular space, and Bogardus' iron front developed into a standardized pseudo-Renaissance form that paraded the crowded commercial streets of lower Manhattan. The monumental in urban buildings was most frequently expressed in the unessential embellishments attached to narrow fronts of cramped buildings.

The 1811 plan, it is clear, helped to fix the character of New York as a New World commercial city. The plan conceived of man facing only raw nature on the island; there was no visible past to build around, or even to destroy. It prepared the way for large-scale real estate speculation; it also prepared for expansion into the wilderness lying at the northern end of the island. Moreover, it prepared for traffic, making every street a potential thoroughfare. The plan, in fact, was based upon the street, rather than the open space; and the street became the architect's chief display area, building facades becoming a hanging board of conspicuous ornamentation. This decisive platte of 1811 must be considered, along with Thomas Pope's "rainbow bridge," among the conditions which influenced the idea, and indirectly, the fact of Brooklyn Bridge. To be sure, the very contrast between the realities of commerce and the lyrical aspirations of art will be a crucial part of the bridge's history, as well as the city's from which it springs.

III

In its broadest sense, the tradition which lies behind Brooklyn Bridge is an international one; it is connected with science, with technology, with industry. In this sense, to draw a straight line from the earliest bridges of primitive man, through the ancient, medieval, and modern worlds, directly to the suspension bridge typified by Roebling's masterpiece, would indeed place Brooklyn Bridge in one of its significant contexts. But Brooklyn Bridge also belongs within the context of its own locale, New York city; it belongs within the culture of which the rainbow and the grid are two distinct yet mutual members. The reason for my emphasis on the local tradition rather than the universal one should be obvious; in this tradition, the bridge exists as an idea that refers to more than simply the technical aspects of the structure. New Yorkers, beginning with Thomas Pope, thought of an East River bridge as an expression of the city itself, and, to be sure, of the national culture which the city represented.

In the early stages of this tradition, before Roebling's definite contribution, the idea of the bridge quite naturally conveyed the expectation that, first of all, the twin cities of New York and Brooklyn would expand to the point where a more efficient crossing of the river than the ferries offered would become indispensable,

and second of all, that the cities would be wealthy enough, powerful enough, to construct such a bridge. What I mean to say is that even in the pre-Civil War period, the very thought of a Brooklyn Bridge was connected with the thought of the future greatness of the metropolis. Furthermore, it implied that that greatness would be a material one, which could be enumerated in figures, both of population and dollars.

In the period between 1825 and 1860, when the specific conditions which led to Roebling's plans were incubating, no one seemed to question the value of unrestricted urban growth. There was no rooted tradition in the city to control the increase of citizens and buildings, and the 1811 plan, to be sure, left the impression that growth was to be measured by the number of lots filled in with buildings. The plan was, I have shown, based on prospective expansion to the outer limits of the island.

The statistical story of both Manhattan and Brooklyn, is indeed impressive; it suggests the rapid currents of change which were unsettling American life in this period. The opening of the Erie Canal in 1825 assured New York's preeminence as the commercial capital of the nation.¹⁵ In the 1820's, New York merchants had won

¹⁵Robert Greenhalgh Albion, "New York Port and Its Disappointed Rivals, 1815-1860," Journal of Economic and Business History, III (1930-1931), pp. 602-629. Albion points out that the success of New York commerce was based largely on four

control of both inland and overseas trade. Population, building values, and actual capital increased enormously. In 1810, Manhattan had about 95,000 people; in 1820, 125,000. Between 1820 and 1825, population jumped about 40,000; by 1830, it reached 205,000. A conservative prediction at the time saw one million by 1900; by 1860, it was already over 800,000.¹⁶ Building expanded just as rapidly. In 1825, at least five hundred new business establishments were opened, and at least 3000 new buildings were in construction. In that year, there were twelve banks with a capital of 13 million dollars, ten insurance companies worth together 10 million dollars, and applications pending for 27 more banks, boasting a total capital of 22 million dollars, and 30 more corporations, holding 15 million dollars.¹⁷ By 1860, real estate alone was valued at about 400 million dollars; personal property was worth close to 180 million dollars; fifty-seven banks were worth over 67 million dollars.¹⁸ The concentration of wealth and humanity on this small, fish-shaped island (actually, in the lower

measures: 1) an attractive auction system for disposing of imports, 2) a regular transatlantic packet service, 3) the development of trade along the coast, especially getting southern cotton for New York export, and 4) the Erie Canal.

¹⁶Rodgers, p. 41.

¹⁷Stokes, p. 517.

¹⁸Ibid., p. 677.

tip of the island; north of 42nd Street was still only sparsely settled in the 1850's) seemed endless. And all of this unmistakably meant progress.

The problems of health, housing and transportation were immense.¹⁹ Once it surrendered, through the sale of public lands, the chance of effective central planning, the municipal government, hampered by its subordination even in local matters to the state government at Albany, found it increasingly difficult to mobilize public resources to meet the mere physical needs of such a proliferating city. It could not, for example, control the private initiators of transportation facilities (New Yorkers already in the 1830's spoke of rapid transit); the first street railroad appearing 1831, there were already twenty competing lines, each operating its own self-determined route by 1860.²⁰ Not until the 1890's, under the influence of Abram S. Hewitt, did the city government itself enter the tangled field of public transportation.²¹

Transportation was crucial to the life of the city, as it was to the life of the nation, and the confusion throughout the nineteenth

¹⁹Rodgers, p. 47. See also Arthur Meier Schlesinger, "The Urban World," The Rise of the City, 1878-1898 (New York, 1933), pp. 78-121.

²⁰Stokes, Op. cit.

²¹Allen Nevins, Abram S. Hewitt (New York, 1935), pp. 492-507.

century in New York reveals how uncertainly the city was able to manage its own most crucial affairs. This confusion, which was a result, in short, of unregulated free enterprise and individualism in public utilities, bears directly upon Brooklyn Bridge, which, we shall see, began as a private venture, but became a municipal venture midway in construction. At this point, it is important to remember that urban transportation was indeed the primary function of the bridge, and in this quite literal sense, it was close to the very heart of the city's life.

The specific transit problem which people imagined an East River bridge would solve, had to do, of course, with the twin city of Brooklyn. Daily, something like one-tenth of Brooklyn's population poured across the several ferries into Manhattan, for work or shopping. Then another mass flowed over for the big city night life. The experience of Walt Whitman in the 1840's and 1850's, of living in Brooklyn and working in Manhattan, and passing freely back and forth between the two separate cities, was quite common. Brooklyn, in fact, was much more of a residential city than Manhattan, and came to be known as a "city of homes," and a "dormitory" suburb of Manhattan.

Actually, however, Brooklyn was a full-scale city in its own right; the growth of its population and wealth in the nineteenth century was even more rapid than Manhattan's. In 1810, Brooklyn had about

3000 people, and covered about one square mile on Long Island; at the end of the century, it had close to a million people, and was the third largest city in the country. Of course, much of its sharp increase in size was based on the absorption of twenty-five other villages during the century, but industry and commerce were also major factors.²² By 1880, Brooklyn was third in the nation in number of manufacturing establishments, fourth in the total amount of capital invested in industry, fourth in total value of manufactured products, and second in average wages. It had over 5000 factories; twenty years earlier, it had had less than 500.²³

In spite of its industrial and commercial growth, however, a vigorous village pride persisted stubbornly throughout the century, and indeed has remained, if only in a sentimentalized form, to give the city its special tone in the twentieth century. In the early years of its expansion, however, the spirit of localism had a decidedly defensive tone, as members of the older generation set their teeth

²² Brooklyn received its charter as a city in 1834. In 1840, covering an area of 12 square miles, it had 30,000 people. In 1854, it ranked seventh in the nation; in 1855, after consolidating with Bushwick and Williamsburgh, it jumped to third, with a population of over 200,000. From 295,000 in 1860, it grew to more than half a million in 1882, and doubled again by 1900. See Syrett, *Op. cit.*, p. 140.

²³Ibid.

to resist the encroaching metropolitanism represented by Manhattan. New York and Brooklyn have nothing in common, neither in "object, interest, or feeling," argued General Jeremiah Johnson in 1833.²⁴ Johnson, a revered member of the revolutionary generation, spoke of Brooklyn as though it were a distinct region, set apart from the commercial metropolis across the river; geography, he felt sure, would actually preserve the uniqueness of the region. The waters that flow between the two cities, he wrote, "form a barrier between them which, however frequently passed, still form and must forever continue to form an unsurmountable obstacle to their union." This was surely an anachronistic point of view in 1833, at the height of the internal improvement period, when nature's obstacles seemed to be nothing more than invitations to surmount them, and when the continent's waterways seemed to guarantee national unity rather than the persistence of regional peculiarities.

Although General Johnson's form of localism gave way to a more ambitious variety of community boosting, designed to popularize Brooklyn as a place of residence for New Yorkers, the sense of something lost in the rapid metropolitan growth continued to bother some citizens. Walt Whitman is a good example.

²⁴Quoted in New York City Guide, American Guide Series (New York, 1939), p. 431.

Whitman had grown up in the rural sections of Long Island, and he spent his youth in free contact with both the city life across the river and the village atmosphere of Brooklyn. The easy conversation with both rural and urban ways, with the regional and the cosmopolitan, is a striking feature of Whitman's poems between 1855 and 1860. In "Song of Myself," he renders each way of life familiarly. There is no conflict between the regional and the urban. It is interesting to learn, therefore, that in 1861-1862, just after the publication of his 1860 edition of Leaves of Grass, and just before his departure to the battle front at Fredericksburg, Virginia, Whitman wrote a series of twenty-five articles for the Brooklyn Standard. They were historical and personal reminiscences of Brooklyn. This series, collected as "Brooklyniana,"²⁵ is remarkable not only for what it reveals of Whitman's own frame of mind on the eve of the critical experience of the Civil War, but also, for what it suggests about a frame of mind within Brooklyn itself. This was, according

²⁵The Uncollected Poetry and Prose of Walt Whitman, ed. Emory Holloway (New York, 1932), Vol. II, pp. 222-325. All page references are to this edition.

to the editor of the Standard, the first serious attempt of a local newspaper to record local history, and the attempt proved to be quite popular.

The articles, of course, were not written as formal history, but instead, as a rambling, personal account of local traditions, obscure events, prominent families, old houses, and so on. Whitman wrote not as a scholar but as a popular journalist, and indeed, as a native of Brooklyn himself; he frequently referred to stories he had heard from old timers, like General Jeremiah Johnson, and to his own childhood memories. He also described some of his own favorite rambles and outings to lovely rural spots on Long Island. The entire series has the flavor of a relaxed, easy-going excursion, following the logic of personal impulse.

Certainly, there is small literary merit to these newspaper articles, and Whitman himself did not try to preserve them.²⁶ Nevertheless, it is quite apparent that the series had a significance for him at the time, beyond their value as popular newspaper pieces. The articles were an attempt, he wrote in the opening paragraph of No. 1, to preserve the traditions of the locale. Agreeing with a New York journal, which had remarked "that the whole spirit of a floating

²⁶See the editor's account of the manuscript, ibid., p. 223n.

and changing population like ours is antagonistic to the recording and preserving of what traditions we have of the American Past." Whitman added that this anti-historical tendency was especially true "in the huge cities of our Atlantic seaboard." Brooklyn and New York, for example, are "filled with a comparatively fresh population, not descendents of the old residents, and without hereditary interest in the locations and their surroundings" (pp. 222-223). Still, he felt sure, "there will come a time, here in Brooklyn, and all over America, when nothing will be of more interest than authentic reminiscences of the past. Much of it will be made up of subordinate 'memoirs,' and of personal chronicles and gossip" (p. 223). His own articles with their gossip and personal reminiscences, are a response, in a manner much less demanding than his poems, to the unsettling conditions of American life. They will try to "preserve" what General Johnson tried to defend, the consciousness of a regional uniqueness.

Whitman significantly does not defend Brooklyn against Manhattan; in fact, he encourages closer ties between the two cities. In several of his articles, for example, he makes the point that Brooklyn is a healthier place to live than New York, and therefore, he hopes more New Yorkers will take advantage of the "city of homes." Whitman supports this view about the relationship between

the two cities with historical evidence. He points out that the earliest Dutch settlers themselves selected Manhattan only for their outpost, while Brooklyn was their residence. Manhattan was "sterile and sandy, on a foundation of rock. . .bleak, sterile and rough," while the "aboriginal Island of Paumanock," was a "beautifully rich country, sufficiently diversified with slopes and hills, well wooded, yet with open ground enough" (p. 224). The agricultural settlers chose Brooklyn, the traders chose Manhattan. And although Manhattan has the best commercial situation in the world, nothing recommends the city as a place to live. In Brooklyn, the natural terrain has been preserved, he pointed out, making it a beautiful as well as healthy city.

Whitman seems, in fact, quite sanguine about Brooklyn's future. He sees no conflict between the local pride and regionalism he wants to preserve, and the large urban center of "a great million inhabitants" he prophesises for Brooklyn. In one article, he points out that the greater attractions of Brooklyn were already "steadily drawing hither the best portion of the business population of the great adjacent metropolis" (p. 252). He describes the advantages of Brooklyn; the best and cheapest gas, "the best water in the world," moderate taxes, and honest city authorities (Boss Tweed was at this time rising to power in New York). Most characteristic of all, Whitman boasts of the "architectural greatness" of Brooklyn,

consisting of "hundreds and thousands of superb private dwellings, for the comfort and luxury of the great body of middle class people" (p. 253).

Whitman's localism in the 1860's, then, reflects the awareness of many citizens of Brooklyn that their local destiny, first of all, lies in the direction of more and more growth, and second of all, is intricately connected with the big city across the waters. The pressure for an East River bridge, it is interesting to note, came mostly from Brooklyn, which wanted a convenient highway to permit free passage for those hopeful millions who would live in Brooklyn, own Brooklyn property, pay Brooklyn taxes, and spend their working days in Manhattan. While Whitman himself did not mention the possibility of a bridge between the cities, certainly his point of view was very close to that which eventually succeeded in creating one. The logic of Whitman's own local pride does indeed lead to the preferability of a more efficient means of passage than the ferry offered; the loss of the ferry, however, which was a direct consequence of Brooklyn Bridge, meant the loss, at the very least, of one means of making the transition between the "beautiful hills of Brooklyn" and the "tall masts of Manhattan" an orderly and meaningful one. Writing in the early 1860's, that is to say, Whitman seemed to be only partially aware that he faced a watershed in the history of his city; he looked back to the past of rural

traditions, and ahead to the future of "a great million inhabitants," only faintly suspecting that the difference would be much more than one of numbers.

Between 1825 and 1860, both the physical and psychological conditions which finally produced Brooklyn Bridge were taking shape. The cities needed another means of access, a means of rapid transit, to keep the lines of business open. Nature may have created what General Johnson thought was an "unsurmountable obstacle," but the nature of urban growth pressed the matter close.

There were several interesting bridge proposals in this period. In 1829, the New York Gazette reported a proposal for a chain suspension bridge, optimistically figured at 2100 feet from toll station to toll station, and 160 feet above the river. The proposer had two arguments, which suggested the dual appeal of both the rainbow and the grid of the previous decade: such a bridge would supply a monument to rank Brooklyn and New York with Westminster and London, and, "the rise of property in Brooklyn alone would defray the expense of the project." He also suggested that "pure" water from Brooklyn could be conveyed to Manhattan in pipes under the bridge floor, implying that such a bridge would practically fuse city and country.²⁷

²⁷Engineering News, Vol. X (May 26, 1883), p. 241.

A more feasible proposal came in 1835 from a civil engineer and architect, W. Lake, in a letter to the American Railroad Journal. He referred to the common inconvenience suffered by all ferry users, especially those in a hurry. A solution to the daily interruptions of business, he wrote, would be a suspension bridge, which would not interfere with river traffic (although his plan was for a five span bridge, which would have rather crowded the river with supporting piers). Such a bridge, he pointed out, was not only practical from the engineering point of view, but also profitable from the commercial point of view; it would be a good speculation for an ambitious company. It would also add to the city.

The rapidly increasing intercourse between New York and Long Island will, probably, soon require the formation of a wide street leading from Broadway. What a beautiful connection would such a bridge, as it is here described, form between this supposed new street and Fulton Street, Brooklyn! It would altogether be one of the most magnificent suspension bridges in the world.²⁸

In a subsequent issue of the journal, Mr. Lake reinforced his proposal by describing the theory and history of suspension bridges, referring frequently to Thomas Pope's Treatise on Bridge Architecture, thus demonstrating a continuity in proposals for a "magnificent" bridge across the East River.

²⁸American Railroad Journal, Vol. IX, No. 1 (January 10, 1835), pp. 4-5.

There were yet other plans and projects. In 1836, someone suggested a dike across the river; in the 1840's, there was talk of a stupendous bridge one hundred feet wide.²⁹ One Laputian projector blandly proposed to fill in the East River, giving the city more land, more profit, and settling for all times the matter of bridges.³⁰ It was fitting that in these years a street in Brooklyn running down to the river should be named Bridge Street, and that this street should actually receive the abutment of Brooklyn Bridge in the 1870's. The bridge surely had its own destiny to perform.

²⁹Syrett, p. 146.

³⁰Rodgers, p. 56n.

CHAPTER III

THE AMERICAN DREAM OF JOHN AUGUSTUS ROEBLING

One of his strongest moral traits was his power of will, not a will that was stubborn, but a certain spirit, tenacity of purpose, and confident reliance upon self, that was free of conceit; an instinctive faith in the resources of his art that no force of circumstance could divert him from carrying into effect a project once matured in his mind.

Charles Stuart, Lives and Works of
Civil and Military Engineers of America
(1871)

In a strict sense, the history of Brooklyn Bridge began in 1867, when John Roebling, the world's greatest builder of suspension bridges, laid his plans before the newly-chartered New York Bridge Company. But, the true history of what Roebling claimed would be "the greatest bridge in existence," began much earlier. In one sense, it began when the first European settlers set out to "improve" the natural wilderness of the continent. In another sense, it began when Roebling himself, an immigrant from Germany, arrived in America in the midst of the internal improvement period. In his report, Roebling tried to make Brooklyn Bridge appear inevitable. He took such a tone, not simply for the sake of "selling"

his plans to the company, but because he believed quite deeply that the bridge would make an important statement to Americans about their own civilization.

Roebling, who had studied with Hegel in Germany, and had read Emerson with fervor in America, always had a lively self-consciousness about himself and his creations. He was always an articulate and persuasive writer, on metaphysics as well as mechanics; in his youth, he produced a manuscript, now lost, called "Roebling's Theory of the Universe." As an immigrant in America, he quickly grasped the leading ideas and values of Jacksonian life, and accepted them as his own. As an engineer, he felt that he was participating in the great historical drama of the construction of America. And never did he feel this more keenly, than in his 1867 prospectus for Brooklyn Bridge. In his report to the bridge company, he concentrated what he felt were the meanings of the previous thirty years of technological expansion.

Roebling never lived to see his bridge over the East River; he died in 1869 as a result of a ferryboat injury while taking soundings for the New York pier of the bridge. His son, Washington Roebling, succeeded him as chief engineer of construction, and tried to follow his father's plans in all details. The final bridge differs from the original plan only in minor details; it remains John Roebling's bridge. For this reason, it is well worth examining

Roebling's career at some length, to uncover the most immediate and most influential source of Brooklyn Bridge, both the fact and the symbol.

I

If anyone in America in the 1860's was qualified to build a monument to the age, it was certainly John Augustus Roebling. His own life was a bridge between the old, rural America, and the new urban society, and his career reflects the changes and the continuities between both ways of life. The Jacksonian ideas he espoused in his early years in America remained with him, as he made the familiar passage from a small rural community to a large industrial center; he never doubted that the ideals of independence and the realities of commerce could coexist in America.

Roebling, interestingly enough, did not come to America to practise engineering; he came simply for the opportunity to do whatever he wanted. In Germany, as a graduate of the Berlin Polytechnic Institute, he had been obliged to serve as an assistant road-builder in Westphalia; he soon found that he would always feel stifled and frustrated by the ponderous Prussian bureaucracy. A childhood friend, John A. Etzler, the same who wrote several visionary tracts about a technological future,¹ convinced Roebling to

¹John Adolphus Etzler had an elusive career, almost impossible to reconstruct. He published his tracts in both America and England, and listed his American address as Pittsburgh. His

leave the old world for the new; together they organized a group of immigrants, and left for America in 1831. Etzler's intentions proved utopian for Roebling, and the men took separate paths - Etzler and his followers moving west, and Roebling with his group taking a more cautious path. They bought a tract of land near Pittsburgh and founded a town, Saxonburg, based on family farming.

Roebling's association with Etzler offers an interesting contrast in character. Etzler, who had already been to America, and had returned to Germany to encourage large-scale immigration, apparently tempted young Roebling with his dazzling plans. But

residence in Pennsylvania, his German origin, his obvious training in mechanics, his enthusiastic promotion of both immigration to the American west, and socialistic schemes, makes it appear certain that he is the same J. A. Etzler mentioned in Roebling's correspondence as a childhood friend, also with an engineering background, who had returned to Germany around 1830 to encourage immigration, who was under suspicion by the police, and actually jailed at one time, and who finally parted with Roebling in America, to try a socialistic scheme further west. For a summary of Etzler's publications and his ideas, see Joseph Dorfman, The Economic Mind in American Civilization, Vol. 2 (New York, 1946), pp. 681-684. Etzler's association with Roebling was reconstructed from the latter's correspondence of 1831, collected in "Opportunities for immigrants in Western Pennsylvania in 1831," The Western Pennsylvania Historical Magazine, Vol. 18, No. 2 (June, 1935), pp. 73-108, from Hamilton Schuyler, The Roebling's (Princeton, 1931), pp. 21-24, and from D. B. Steinman, The Builders of the Bridge (New York, 1945), pp. 18-34.

from the beginning of their venture, Roebling had a hard-headed circumspection befitting a Polytechnic graduate. In the diary of his trip to America, he wrote, "It is not contempt for our Fatherland that causes us to leave it, but an inclination and an ardent desire that our circumstances may be bettered."² He had no "exaggerated views or extravagant hopes," and he knew that success in America would depend only on the "personal energy and power of will of each individual."³ Roebling's own resources of energy and will were extraordinary; he was determined to succeed at all costs. Later in his life, Roebling's will became stern and austere, and as a success in American society, he became a formidable personality indeed; his son, Washington Roebling, usually addressed his father as Mr. Roebling. On board ship traveling to America, however, the young man was deeply moved by the sweep of the ocean, which measured the sweep of his own radical act of disrupting a normal German professional career. This was not a tentative venture for him; he was freeing himself from Europe with finality. "As we see the last of the shores of Europe vanish from our sight," he wrote, "we separate ourselves at a single stroke from

²Diary of my journey from Muhlhausen in Thuringia via Bremen to the United States of North America in the year 1831 (Trenton, Roebling Press, 1931), p. 1.

³Ibid.

the Old World." He knew that the past would linger in memory, but he was prepared to face an open future, in which individual will and enterprise would assure him of better circumstances.

The theme of his diary and of his early letters to his home in Muhlhausen, Germany, was that America stood for "personal freedom and natural independence." In America, a man may choose his own fate, free from "unnatural" restraints. He refers continually to "the fate that we have chosen of our own free will," to the "reasonable and humane Constitution" which assures each man of his "natural rights," to the absence of laws which "hinder human endeavor."⁴ "I have found all that I sought," Roebling wrote home:

a free, reasonable, democratic government and reasonable, natural relationships of the people toward each other; freedom and equality; a peaceful, generous, beautiful country the blessings of which are not forcefully and deceitfully taken away from the land toiler by tyrants. No unbearable taxes - no executor - no arrogant burgomaster, or chief magistrate.⁵

Roebling was prepared to accept Jacksonian America on the level of its highest ideals; if the world should prove good to him, and if he should prosper, those ideals would be justified.

⁴"Opportunities for immigrants in Western Pennsylvania in 1831," p. 75.

⁵Ibid., pp. 103-104.

In light of his commitment to the American Dream, which fused man's independent will with worldly success, it is no surprise that Roebling quickly absorbed the language of agrarianism. "The American farmer lives a very happy life indeed," he wrote to a prospective immigrant in Germany,⁶ echoing the core ideas of Jefferson's formulation. Roebling praised the farmer's self-sufficiency, pointing out that rural families made their own clothing and had "a surplus of the necessities of life." "Contented people can in truth lead a happy, free, and unconstrained life here. The American farmer does not work half so much as the German farmer and lives like a prince as far as his own necessities are concerned." At the same time, Roebling understood the "hard" side of the agrarian point of view, the side which was not content with mere necessities, but longed for luxuries as well. The farmer's relation to a market, Roebling saw, was the key to his happiness. Describing why he chose to settle in Pennsylvania rather than further west, Roebling showed how urgently the American Dream demanded a system of roads for its fulfillment. In Pennsylvania, he wrote to his friends in Germany, "we are in one of the most advantageous sections of America, in the vicinity of a good market. . .where we can dispose of all products for cash."⁷ The western farmer, on

⁶Ibid., 97.

⁷Ibid., 75.

the other hand, was cut loose from this source of economic independence. He wrote:

Now, consider this: the farmer of the western states must compete in one market with the Pennsylvania farmer. . . Think of the transportation! For the western farmer there is very little profit; he must barter his products for a mere trifle, and the merchants with whom he deals in turn use this method to enrich themselves through the farmer's hard toil. . . Many people go out there, lured by the reputation of the West. . . Many have returned from these moorlands of the West, sick and weak, and have then stayed in Pennsylvania.⁸

The farmer's independence, in other words, depended upon transportation, and although he may not have known it at the time, this need for a system of mechanical links between the ideals of the American Dream and the realities of a commercial society, would give Roebling his own major opportunity for success.

Roebling did not remain a farmer very long. In a few years, he was working as an assistant engineer on the Pennsylvania Canal. In the course of his work, he devised a method of producing spun-wire cable rope to replace the bulky and inefficient hemp ropes used for the portages over the many ridges along the canal. The invention grew out of one specific need of the canal system, which served an essentially rural economy, but its importance extended far beyond its initial application; eventually, it found its way into the traffic bridges which Roebling built for the cities of

⁸Ibid., 79.

Pittsburgh, Cincinnati, and New York. Roebling quickly patented his device, and launched his manufacturing career, beginning in his rural village of Saxonburg, but soon moving to the industrial city of Trenton, New Jersey. He had shifted his entrepreneurial talents from agricultural to manufacturing. But the ideal of independence and freedom from institutional restraint, which had attracted him to the soil, remained the stern principles of his career.

II

"My father always held it as a necessity," wrote Washington Roebling, "that a Civil Engineer (one of the poorest professions in regard to pay) should always, when possible, interest himself in a manufacturing proposition. The rope business being established, his ambition prompted him to greater efforts."⁹ Roebling's business was his hostage to fortune; it was the realistic ground upon which he built his career as a maker of bridges. By analogy, it was a Pennsylvania farm, close to markets, profitable in its cash returns, and so, a source of personal freedom and independence. The professional civil engineer, by the same token, was like the western farmer, caught in the web of economic uncertainty. Business success would free Roebling from the middlemen; he would produce his own products, either wire rope or wire bridges, on his

⁹Quoted in Steinman, p. 111.

own terms, and personally reap the reward. This was Roebling's American Dream.

Roebling's appraisal of the profession of engineering was as accurate as his insight about the cul de sac of farmers isolated from a market. The civil engineer as a vocational type was literally created by the internal improvement period; he did not spring into existence, as many people may suppose, as a free-booting craftsman or a gentleman-builder. These independent types did in fact exist in the eighteenth and early nineteenth century, but the typical civil engineer after the 1830's had a career restricted and defined simply by the opportunities for work, and these were almost exclusively "public works." By the 1840's, the engineer was already institutionalized within American society; he owed his existence to the construction corporations which had control of the buildings of roads, canals, and railroads.¹⁰

As an aspiring builder of bridges in the late 1830's, Roebling faced this problem: just how much freedom of choice did an engineer have? At the time he began his career, this issue was almost settled. The state engineering corps, along with the military engineering corps, and private contracting companies,

¹⁰My account of civil engineering in this period is based largely on Daniel Hovey Calhoun, The American Civil Engineer (Cambridge, Mass., 1960).

bore the major responsibility for training engineers and identifying their roles within the corporate hierarchy of construction projects. Roebling, although he had one of the best possible school trainings in Europe, had to begin at the bottom of the hierarchy as an assistant engineer in the Pennsylvania corps.

Roebling began his work on the Pennsylvania canal system in an auspicious year, 1837. The major depression of that year marked the end of the first important period of public improvements in America. It had been an experimental period. In 1816 there was virtually no engineering profession at all (there were about thirty persons in the entire country who could qualify as chief engineers); at the end of the period, the engineer was already fixed as an occupational type. By 1837, the older generation of rather miscellaneous builders, including both gentleman engineers with an aristocratic interest in "improvements," and traditional craftsman-builders, upon whose meager skills the transportation revolution began, had died out; a new generation, who had learned their work and their status within the structure of an internal improvement project, had become the core of the profession.¹¹ This shift in vocational type reflected a shift in the procedure of construction projects. Earlier, the eighteenth century notion of the

¹¹Calhoun, pp. 51-53.

"stake in society" had produced a gentleman-proprietor-engineer as the leader of projects. Daniel Hovey Calhoun writes, "In a sense that touched both the Jeffersonian's yeoman and the Federalist's man of substance, Americans seem to have regarded proprietorship as a guarantee of trustworthiness and of one's readiness to conform to the interests of an enterprise. . . Ownership and economic involvement were guarantees the mere professional could not offer."¹² In the period from 1816 to 1837, however, the company, staffed by professionals, quickly replaced the older type; projects of large scale demanded a more complex organization of skills and techniques than the older method could manage. The actual engineer more and more became simply an employee of the company, in control of only a limited area of assignments.¹³

In 1837, then, Roebling entered the increasingly restricted world of the engineering profession. The profession did not get an organization of its own until the permanent and powerful American Society of Civil Engineers was established in 1867 - the year of Roebling's Brooklyn Bridge proposal. The intervening thirty years cover almost exactly Roebling's career (he died in

¹²Ibid., p. 16.

¹³See Calhoun, Chap. 3, "The tasks of the engineer," pp. 54-91.

1869); his great achievements, in other words, occurred simultaneously with the emergence of a new, self-conscious professional class in America.

From the point of view of the engineer's behavior strictly as an engineer, as a designer and executor of public projects, Roebling was an exemplary member of that class. He was, as his biographer, David B. Steinman, writes, "a real engineer, in the higher sense of the term, and not merely a trained technician."¹⁴ Roebling's Brooklyn Bridge report, as we shall see in the next chapter, expresses his conception of the engineer's work. The point here, however, is that Roebling had to make certain adjustments, to learn certain strategies, in order to get the chance to put that conception into effect. His manufacturing business freed him from reliance upon the engineering profession for a livelihood, but still, he had to get commissions in order to build bridges. Roebling had to learn how to take measure of the limited possibilities, to manipulate his way within construction companies, and yet always to remain essentially free of any company. His ability to preserve his independence, to be sure, gave him the leisure, so to speak, to practise his art on his own terms and to become a "real engineer."

¹⁴Op. cit., p. 226. Himself one of the leading suspension bridge builders of the twentieth century, Steinman claims to have been directly inspired by Roebling and Brooklyn Bridge. In the

In time, Roebling became America's most persuasive engineer, in the words of his reports as well as the endurance of his bridges. In 1837, however, the future did not appear promising at all. Roebling was laid off after a few months on the Pennsylvania Canal. He decided to find another job, and addressed a letter to the chief engineer of another canal project in Pennsylvania. "I cannot reconcile myself to be altogether destitute of practical occupation," he wrote, and then proceeded to outline several projects, "some new plans and construction," which he had worked out in thorough detail.¹⁵ These included ambitious improvements in the dams and locks in Pennsylvania, as well as navigation improvements at the mouth of the Mississippi, and a new contrivance for railroad switches. These may have been feasible from a technological point of view, but as proposals for actual construction, they are notably naive and unrealistic. Roebling was obviously a beginner in the field of public works in America; he failed to realize that projects began not so much because they were "necessary," or truly "improvements," but because they were economically convincing to a private organization which had sufficient command of funds, including the requisite influence over state legislatures for public

Preface to his biography of Roebling, he writes, "In partial discharge of that debt of inspiration, the writing of this book has been undertaken" (vii). Steinman was in charge of the renovation of Brooklyn Bridge in 1948).

¹⁵Quoted in Steinman, p. 49.

funds. Roebling learned his lesson, and his later proposals were cast as polemics against the assumed resistance of skeptical business interests.

Later in 1837 Roebling returned to his old position with the canal system, working at minor jobs within the hierarchy. After a few years, during which he surveyed for extensions of the canal and for new portage railroads, he was raised to Principal Assistant, and given charge of a survey for a possible railroad between Harrisburg and Pittsburgh. While on this job, in 1841, Roebling devised and patented a method for spinning wire rope, and established a small plant at Saxonburg. In connection with this invention, Roebling encountered his first serious resistance from the higher ranks of the canal system, who were reluctant to accept wire rope for the portage railroads; that would have meant revising existing costs.¹⁶ The rope was eventually accepted, and the Pennsylvania canal became the first market for Roebling's product. His job, meanwhile, gave him the chance to apply his invention directly to the mechanical need which inspired it. But how was he to get the chance to exploit the larger construction possibilities of wire rope? It became clear

¹⁶For an account of the resistance to wire rope Roebling met on the Pennsylvania Canal, see Ibid., pp. 72-75.

to him that the chances for experimental work were quite limited within the conventional engineering corps, whose main function was the maintenance and improvement of existing works, and whose connection with state politics circumscribed all innovations.

The next phase of Roebling's career was his emergence as an independent chief engineer in the construction of bridges. It was a slow process of learning how to make his way among those who had the power to give him commissions. This phase began in 1845, when Roebling won an open competition for an aqueduct over the Allegheny River at Pittsburgh; he submitted a design for a suspended structure, employing his own wire rope, and devised a method for spinning and stringing the cables in place (instead of the usual practise of spinning the cables on shore, and then hoisting them into place); he also worked out a new, more secure form of anchorage.¹⁷ The same year, an old timber bridge across the Monongahela at Pittsburgh burned down, and Roebling immediately offered a plan with a strategically low estimate, in order to raise his first suspended highway bridge. On the evidence of these two quick achievements, his reputation spread, and in the next four years he was commissioned to build four more suspension aqueducts for the

¹⁷For a technical description of this, and other works of Roebling's early years, see Steinman, passim.

Delaware and Hudson Canal Company. By 1850, he had six suspension structures to his credit, and was ready to begin his most productive period, and build his most famous bridges.

In the decade between 1840 and 1850, Roebling's education in the ways of the professional world was stimulated by his several encounters with Charles Ellet, Jr., another famous American suspension bridge builder. Ellet, brilliant and rather flamboyant, represented the new generation of American-born professional engineers. He arose within a conventional engineer corps, and had no significant independence outside of construction companies. In consequence of this, his creativity was again and again frustrated simply by limited opportunities to work out his projects. Historically, Ellet appears as little more than a footnote to Roebling, but his career was quite significant in its own right.

A typical event of Ellet's professional life was this: in 1836 he was selected as chief engineer of the James River and Kanawha Company in Virginia. He was selected over two other candidates because, it was pointed out, he excelled in "the higher tactics of the profession," that is to say, "in the politics of internal improvement."¹⁸ He served the company well, acting as a promoter as well as an engineer; he wrote pamphlets, reports, and articles, defending

¹⁸Calhoun, Op. cit., p. 120.

projects and proposing new ones. Then suddenly, three years later, in 1839, he was fired without back pay. The company had tried to limit his judgment in certain matters, and although he was willing enough to be a promoter as well as a builder, he objected to this further restriction of his talents. The company valued obedience over talent.

Ellet was an organization man, unhappy about his circumstances, but helpless to change them. He was born on a farm in Pennsylvania in 1810, destined by his father to be a farmer. At seventeen, however, he left home, worked for a year as a rodman on a survey in Pennsylvania, and then was appointed as a "volunteer assistant" on the Chesapeake and Ohio Canal, without a fixed position or a fixed pay.¹⁹ By 1830 he had saved enough to travel to Paris to enroll in the Ecole Polytechnique, and became the only native American engineer at the time with European schooling. He returned in 1832; a young, ambitious civil engineer of twenty-two, and boldly confronted Congress with a plan to construct a 1000 foot suspension bridge across the Potomac River. The plan failed to impress anyone, and he returned to his earlier work as an assistant, and later as a chief engineer, with various canal and railroad companies. After leaving the Virginia company in 1839, he wrote several essays on the

¹⁹Charles B. Stuart, "Colonel Charles Ellet, Jr.," Lives and Works of Civil and Military Engineers of America (New York, 1871), pp. 257-285.

economics of railroads and other internal improvements, proposed a design for a suspension bridge across the Mississippi at St. Louis, and finally managed to erect a bridge at Philadelphia. Of his many other bridge designs, only two were actually built; none of his bridges survived his own life. Another favorite and far-sighted project of his was a flood control system for the Mississippi, which also failed to impress anyone in power. He was killed in the Civil War during a skirmish in which his own designed steam battering rams were used successfully against a rebel fleet.

Ellet, then, was an experienced professional; in realistic terms, he was an engineer by virtue of his place within various companies. Only rarely, and then on unsatisfactory terms, did he have the chance to perform as he knew an engineer should, with complete control over an entire project. His professionalism, in other words, was a measure of the restrictions within which he was compelled to work; his mastery of the "politics of internal improvement" was not enough to permit him to transcend those restrictions. Because of his talent and training, as well as his independent temperament, Ellet did not sit quietly in his status as a corporate engineer; his career was marked with quarrels and impetuous squabbles. He was a man whose genius was dissipated by the peripheral strategies of his profession.

In 1840, Ellet publically advocated a suspension bridge across the Schuylkill River at Philadelphia.²⁰ The proposal was widely heralded, and Ellet was confident the commission would be his. Roebling, meanwhile, was engaged as a surveyor on the Pennsylvania canal, and his chances for building bridges seemed dim indeed. When he heard of Ellet's proposal, he wrote an enthusiastic letter, offering his assistance to the more experienced engineer. The idea of a major suspension bridge on the continent thrilled him. He wrote:

Let but a single bridge of the kind be put up in Philadelphia, exhibiting all the beautiful forms of the system to the best advantage, and it needs no prophecy to foretell the effect, which the novel and useful features will produce upon the intelligent minds of the Americans.

He addressed to Ellet his belief in the radical individualism of the true engineer:

You will certainly occupy a very enviable position, in being the first engineer who, aided by nothing but the resources of his own mind and a close investigation, succeeds in introducing a new mode of construction, which here will find more useful application than in any other country.²¹ (my emphasis)

Ellet's reply was chilling and condescending; he ignored Roebling's offer of assistance, apparently sensing a rival. As it was, the

²⁰Charles Ellet, Jr., "Plan of the Wire Suspension Bridge about to be constructed across the Schuylkill at Philadelphia," American Railroad Journal, Vol. X (March 1, 1840), pp. 129-133.

²¹Quoted in Steinman, p. 57.

commission was not awarded to Ellet, but to a contractor with no bridge experience. Roebling had followed the bids, and immediately offered his services to the successful contractor, was accepted, and seemed about to launch his career as a chief engineer. Ellet, however, did not take his defeat as final, and through a skillful job of promotion, which included the offer to take real estate lots as payment for his work, he managed to have the contract wrested away from Roebling's superior. The immigrant engineer was baffled and disturbed to learn that, after all, he would not have his chance. But the lesson was clear.

The next encounter between the two men came several years later; both had responded affirmatively to a circular letter in 1845, inquiring about the feasibility of a bridge to carry a railroad across the Niagara River just below the falls; both, in fact, argued that the suspension type would best fit the task, even though the great British engineer, Robert Stephenson, had spoken out in favor of the tubular type of bridge as the only secure type for heavy, moving loads. Both Ellet and Roebling knew the scope of the challenge; the man who would construct a safe suspension span at this location would become overnight the world's leading suspension bridge builder.

From the time of the circular letter, Ellet managed to have his name often appear in print associated with the new Niagara

bridge. In 1846, a company was chartered, and Ellet made a specific offer to build the structure as engineer-contractor, responsible for materials and laborers as well as actual design. He also offered to subscribe to a substantial amount of the stock. Roebling was compelled to make a similar offer, but Ellet's contacts paid off, and he won the job in 1847. Less than a year later, however, after a small footbridge was erected, Ellet quarrelled with the company directors about the application of tolls from the footbridge; once again, he was forced to leave a company position before he could complete a project which surely would have been impressive.²² Roebling was now able to negotiate a more favorable position for himself. He became a salaried engineer-supervisor, completely free from the duties of contracting and supplying materials. He could now deploy his talents as he wanted, and the result was his first great bridge, completed in 1855.

Roebling's reputation was assured, and with his wire rope factory beginning to flourish in Trenton, he was free to pursue the art of the suspension bridge. His earlier instinct about the value of one successful model proved accurate; the new form was readily accepted as a legitimate and sturdy bridge type. Roebling's next commission, therefore, was in many ways his most ideal and his

²²For a narrative of the Niagara Bridge situation, see Steinman, pp. 157-194.

easiest. In 1857, an old bridge over the Allegheny River at Pittsburgh had become unsafe, and Roebling was quickly given the task of replacing it with a suspension structure. The conditions Roebling commanded in this job were nearly perfect; his reputation by this time quite secure in Pittsburgh, the bridge company gave him a free hand. He submitted his plans and his estimates as he went along, and met no resistance. Also, there was no problem of financing; as D. B. Steinman points out, "for the first and only time in his career the builder had ample funds. . .to build a bridge according to his best ideas of substantial construction."²³ The bridge was not one of his most impressive creations; it had four short spans instead of one soaring span. But it is one of his most beautiful, the series of latticed towers presenting a quiet, undulating effect.

Roebling's next project was much more trying, and much more impressive. His earliest associations with a bridge between Cincinnati and Covington, over the Ohio River, was in 1846, when a bridge company chartered by the Kentucky legislature had contacted him, on the basis of his first Pittsburgh bridge. He was asked to draw plans for a suspension bridge, even though river traffic interests had successfully blocked approval of the project

²³Ibid., p. 208. This was also the first project in which Washington Roebling participated.

in the Ohio legislature. The plans were to be published as a promotional pamphlet to win over the Ohio lawmakers. This was Roebling's first experience in promoting a major project, and his document shows how carefully and thoroughly he prepared his case. The resistance to the bridge was based mainly on the argument that a bridge would interfere with river traffic; its piers and its low ceiling, it was thought, would obstruct steam boats with high smoke stacks. Roebling took the occasion to argue for the idea of the suspension bridge, as a universally feasible form; such a form would not require mid-river piers, and the roadway could be arched enough to meet the necessary clearance. The pamphlet, though it did not succeed in winning the necessary votes, was remarkable for its accurate prediction about the future of the suspension bridge, and for its grasp of the commercial implications of such a bridge.²⁴

Ten years passed before the bridge company was finally able to begin work, and Roebling, assured of the commission, was asked to write another promotional report for circulation among potential stock subscribers. By now Roebling was a master builder to be reckoned with; he had placed the Niagara Bridge and the Allegheny

²⁴For a full account of the events leading to the construction of the Cincinnati-Covington Bridge, see Schuyler, Op. cit., pp. 115-131, and Steinman, pp. 217-295.

Bridge among the world's foremost modern structures, and now faced his greatest job, a suspension span of unprecedented size, with huge masonry towers. Furthermore, Ellet was at last out of the picture.²⁵ Roebling negotiated slowly and carefully for this position, and won for himself the conditions of free supervision and unlimited control over construction. These were the conditions he required for his art. Hampered by the Civil War, and serious floods and storms, the Cincinnati-Covington Bridge was not completed until 1867, when Roebling's mind was already engaged with the idea of an even greater bridge at New York. On the threshold of his supreme effort, Roebling had earned an admirable position within American society. Unlike his closest competitor, Charles Ellet, he showed that he was able to dream his dream and have it too.

III

I have tried to show that John Roebling was not by any means a "typical" American engineer in the crucial period of 1830 to 1860. Leaving aside matters of personality and genius, his very position as a successful manufacturer meant that, unlike Ellet, he did not

²⁵ Ellet was actually the first bridge-builder to span the Ohio with a suspension structure; his bridge at Wheeling was, until Roebling's Ohio bridge, the longest in the world. Unfortunately, the bridge suffered a great deal of damage in a storm in 1854 (it was built in 1849), and Roebling was assigned the job of reconstructing it according to his own principles of stiffening trusses. This seems to have been the last encounter between the two men, and indeed a symbolic one. See Steinman, pp. 181-183.

rely upon the engineering profession for his livelihood. Being atypical in the social sense, however, actually freed Roebling to define what was typical of his vocation in the purely technical sense. He was able to function as a civil engineer par excellence. In his actual creations, and just as significant, in his conception of his own work, Roebling showed his mastery of the technological possibilities of design and planning. He was an eminent example - certainly the foremost in America - of the nineteenth century engineer whose works are cited by Walter Curt Behrendt and other critics as opening up "a new world of forms" in architecture.²⁶ The precise nature of Roebling's contribution to the world of forms will be discussed in a later chapter; what I want to point out here, however, is that the engineering consciousness which Roebling represented extended to the area of comprehensive planning as well as to the formal design of single structures.

²⁶Modern Building (New York, 1937), p. 71. Behrendt writes, "It is not the architecture of our modern city halls, libraries, and museums, designed for monumental display rather than for practical use, that first manifested the new spirit of building, but it is the new iron bridges and derricks, the furnaces and cooling towers, the silos and wide-spanned worksheds, in short the works of the engineers which wholly changed the face of the cultivated land." A hint of the versatility of Roebling's own engineering and design talents is suggested by his serving as architect, designer, draftsman, engineer and inventor of his Trenton plant, opened in 1848.

Roebbling brought to his planning not only a firm, rational grasp of technical possibility, but also a deep sense of the values of the civilization he was building for. Roebbling saw America as a hard-headed commercial civilization; he meant this, as we have seen, in the old, individualistic sense (what we now call the "inner-directed" sense). We have seen that, in his choice of a location for his original rural settlement, he understood a good deal about commercial realities in America. Later on, in the 1840's, as his consciousness of the intricacies of business life deepened, he grasped even more of the realities of American commerce.

For example, in 1847, after several years' experience surveying for a railroad in Pennsylvania, he delivered a paper before the Pittsburgh Board of Trade, arguing for a "Great Central Railroad" between Philadelphia and St. Louis, to capture the western trade for Pennsylvania businessmen.²⁷ The paper shows that Roebbling, on the one hand, had fully absorbed the popular rhetoric supporting internal improvements, and on the other hand, had a remarkably accurate vision of the relation between commercial needs

²⁷"The Great Central Railroad from Philadelphia to St. Louis," American Railroad Journal, Special edition, 1847. Page references are to this edition. The article also appeared in Vol. XX (1847), pp. 122-125, 134-135, 137, 138-141, 155-157.

and technological resources. His principal premise was that transportation technology was so advanced, that comprehensive control and planning for the sake of efficient commercial transactions, was now a genuine possibility.

"So far has this system been successfully developed," he wrote, "that we may project with unerring certainty in advance of population and traffic. In place of railroads growing out of commerce and wealth, the former are now creating the latter." (p. 1) Technology, that is to say, is a cause of commerce. The virgin continent, Roebling recognized, promised untold wealth; it also promised political stability. Both of these ends, he argued, required the use of mechanical means, namely, railroads. "Like a magic wand," he wrote, "they open the slumbering resources and long-hidden treasures of the earth; convert stone and iron into gold; draw into bonds of union and amity isolated individuals, as well as communities and nations." (p. 1.)

These ideas and images, of course, were familiar fare in this period. What is significant, however, is that Roebling not only accepted the popular ideas of this period of expansion, but also suggested a precisely technological means for realizing the age's ideals. He tried to argue the American businessman into a high consciousness of himself as a "man of commerce" with a noble office in national life. Such a consciousness would see with

clarity the advantage of central planning of commercial routes.

Roebling appealed to his audience's own ideals of free competition and profitable commercial rivalry. For example, Roebling pointed out that the incentive to build the proposed road was quite simply to "secure a connection with the west before it can be done by our rivals." (p. 10) He spoke as a member of the business class of Pennsylvania, and demonstrated that the port of Philadelphia and the workshops of Pittsburgh needed the western markets, to exchange imported and manufactured goods for agricultural goods. "The whole west is invoked to assist us in this vast work," he wrote. He drew a clear picture of the competitors: New York, which, like the "Venice of old," was complacent about its commercial empire; Boston, which had already cut into the New York wealth by constructing the Great Western Road. If the Pennsylvania entrepreneurs would act quickly and decisively, exploiting the magic of technology, then "the tributes of commerce. . . from their extensive net of artificial improvements, will flow like a torrent into Pennsylvania." (p. 11) Roebling did not equivocate: "The business of the west is within our reach; we can grasp and retain it with unerring certainty, provided we start and act systematically throughout. The means we should employ are to be fully adequate to the magnitude of the object we have in view." (p. 2)

For Roebling, commerce was a noble activity, and rivalry was its appropriate form. He wrote, "We shall not allow our policy to be governed by feelings of envy. A generous, high-minded and honorable rivalry shall prompt us in the pursuit of our enterprise - we will remember that the Great West offers room for us all!" (p. 11). In these words, the notion of commerce, not merely as a means toward private wealth, but as an American way of life, speaks unmistakably. And furthermore, the Great West, touchstone of many American hopes, guaranteed that this way of life would have a foundation in nature itself.

As manifestly as in his bridges, Roebling's engineering consciousness is forthright and impressive in this essay. He understood the individualistic temper of his age, and in his bridges tried to give that spirit a precise form. He was able to do so because, like his contemporary H. H. Richardson, he knew that the age required its physical equivalent in solid forms of stone and iron. Only a man steeped in his age, yet sufficiently independent of its narrow restrictions, could have accomplished this.

In the figure of John Roebling, two systems of value merge - that of the "old" entrepreneurial independence, and the "new" technological consciousness. His struggles to maintain both values in a world of increasingly circumscribed opportunity are valuable

for the historian of society in America; they express an underlying conflict in the nineteenth century between technological possibility and the social means for realizing that possibility. The shift from a proprietary to a corporate manner of managing public works had the effect, in the pre-Civil War period, of limiting the chances for an imaginative technologist like Ellet to develop his projects. Roebling succeeded where Ellet failed, not only because of his greater talent and force of personality, but also because of his practical independence. The monument he placed over the East River, celebrated, in his own mind at least, the virtues of exactly that independence.

PART II

BROOKLYN BRIDGE: THE SHAPE

CHAPTER IV

THE MASTER PLAN: JOHN ROEBLING AND THE BOARD OF DIRECTORS

The all-dominating issue in business is the question of gain and loss. Gain and loss is a question of accounting, and the accounts are kept in terms of the money unit, not in terms of livelihood, nor in terms of the mechanical efficiency of the industrial or commercial plant. For business purposes, and so far as the business man habitually looks into the matter, the last term of all transactions is their outcome in money values.

Thorstein Veblen, The Theory of Business Enterprise (1904)

By the time of the Civil War, the idea of an East River bridge was already well-rooted in the New York-Brooklyn community. Only a feasible plan and a competent organization to carry it through remained to convert the idea into a fact. When John Roebling presented his Report to the New York Bridge Company in 1867, both of these conditions were met, and Brooklyn Bridge came to life.

Roebling's Report is a masterpiece of planning. It is also a deliberate, forceful argument. The Report reflects the most essential condition of the bridge's origin: the structure began its life as a private business investment, not a publically-owned utility.

Roebing, in other words, addressed his Report to a specific audience; he proposed to build a bridge which they would control and administer, a bridge which would, in effect, be theirs to run, and the public's to use. Eventually, Brooklyn Bridge did indeed become public property, and the Opening Ceremonies in 1883 were organized about the formal bestowal of the bridge to the cities. But when Roebing cast his master plan into persuasive words, the task he had in mind was to sell his project to a group of private buyers. For this reason, his Report is all the more valuable; through its original audience, it connects Brooklyn Bridge with the values of America's commercial civilization in the Gilded Age.

I

When Brooklyn Bridge was fifty years old in 1933, the New York Department of Public Works prepared a brochure with a historical account of the city's most famous landmark. The Forward included this passage:

The construction of this bridge involved the solving of the greatest engineering problems up to that time. The work of the engineers would have been impossible had it not been for the public spirited men of vision in the cities of New York and Brooklyn.¹

The expression "public spirited men of vision" referred to the leaders of the original bridge company, and later of the municipal .

¹Chronological Narrative of Brooklyn Bridge (Department of Public Works, City of New York, 1933).

board of trustees, who consistently supported the project during thirteen years of difficulties. Whether these men were in fact "public spirited," is less important than another fact implied by the expression. I mean the fact that private citizens, rather than municipal government, possessed the necessary power and resources for projects of such obvious public utility as Brooklyn Bridge. In the absence of a public capable of acting for itself through local government, "public spirited" individuals, with little or no formal ties of responsibility, became the only effective agents of community development.

This was a fact Roebling had to reckon with, and he was well prepared. He became interested in an East River bridge as early as 1852, after spending some inconvenient hours stranded in a helpless ferry boat on the ice-filled river. In 1857, Roebling expressed his interest in a letter to Abram S. Hewitt, a New York iron-master who operated a mill along with Peter Cooper near Roebling's own plant in Trenton. Hewitt had the proposal published in the Journal of Commerce, where it naturally attracted attention, but no definite action. Roebling by this time had completed the Niagara Bridge, and was internationally respected. Having solved the problem of a railroad-bearing suspension bridge, he was now working on the problem of a big city highway bridge, at Pittsburgh as well as Cincinnati. An urban traffic bridge, with

its unique construction demands, was obviously on his mind.

In 1864, Roebling published in a London engineering journal a brief account of his ideas for an East River bridge. In its essentials, this account, which must have been in mind since 1857, is very close to his final plan of 1867. He intended, quite clearly, to build a monumental structure. "I propose," he wrote, "to start in the vicinity of the Park of the city of New York, at an elevation of about 80 feet above tide, thence ascending about 125 feet to the center of the East River (leaving a clear elevation of 180 feet), thence descending toward the heights of Brooklyn, and landing within sight of City Hall. . . The superstructure of this magnificent bridge would thus form an arch about two miles long, clearing the water of the East River in one sweep."² Such was Roebling's earliest description of his bridge: a graceful arch, swooping from City Hall to City Hall, out of the heart of one city into the heart of the other. This brief account, in the form of a letter to the journal, does not present many specific details; Roebling stressed the over-all magnificence of his plan. He did suggest that the structure would have two floors, like the Niagara Bridge. The upper floor, he said, would carry railway cars, and the lower floor would be for "promiscuous travel on foot, horseback,

²The Engineer (London), Vol. 17 (February 19, 1864), p. 107.

or carriage." Both floors would have sidewalks, which, he expected, would "become favorite resorts for those who want to take exercise in the open air." The final version of the roadway is considerably, and significantly, altered, but it is clear that Roebling was searching for a form that would answer the need for rapid transit without denying the alternative of a lively open-air saunter. His bridge would have its human dimension.

Roebling was determined to have his chance, and he knew with whom to deal. In 1865, he presented his plan to a group of Brooklyn businessmen, and the idea took hold of William C. Kingsley, one of the city's leading contractors. Kingsley, who eventually became the leading promoter of the bridge, was "a man of large and varied interests and was identified with banks and insurance companies and the Brooklyn Eagle."³ He never held office, but was always influential in Brooklyn politics; in the 1870's, he was the principal advisor of Boss McLaughlin, and earned several lucrative construction contracts.⁴ Kingsley was,

³Chronological Narrative of Brooklyn Bridge, p. 26.

⁴See Harold Coffin Syrett, The City of Brooklyn, 1865-1898 (New York, 1944), p. 75. That William C. Kingsley should become the driving promotional force behind Brooklyn Bridge was especially appropriate in light of his background. His career, like Roebling's, followed the technological growth of the country. Kingsley, however, represented the business and organizational aspects of internal improvements. At the age of eighteen he had left his home on a family farm in New York state, and joined a

in effect, typical of the connivance between municipal politics and local business which was quite extensive in this period.

The procedure required a state charter. With the assistance of State Senator Henry C. Murphy, the legislature granted the charter in April, 1867, incorporating the New York Bridge Company, "for the purpose of constructing and maintaining a bridge over the East River, between the cities of New York and Brooklyn." In May, Senator Murphy was elected President of the Company, and Roebling was appointed Chief Engineer. By September, Roebling had completed his initial report; it was adopted in October, and immediately the Committee on Plans and Surveys recommended commencement of work. Another committee was appointed to raise the capital "from the public, capitalists and the cities of New York and Brooklyn," who were by law authorized to subscribe to the capital stock.

Pennsylvania railroad company as a clerk. Later he became a bookkeeper for a company constructing a canal in that state, and demonstrating that he was capable "by his energy, determination and tact" of subduing "the wild and turbulent character of the workmen," he rose quickly to superintendent of the project. From there he moved further west, followed some contracting opportunities, and became a successful railroad builder. In 1857, following the path of expanding opportunities, he returned to the east, and soon became a successful contractor in Brooklyn. City improvements were his specialty; he knew his way through the channels of municipal government, and won big contracts for waterfront improvements, reservoirs, and sewage works. He tried to keep his hand in railroad and bridge work at the same time.

It seems curious, but true nonetheless, that up to this point, no agency of either city was invited to, nor itself requested to, examine and approve the plans for the bridge, nor the location; it was strictly a matter of private investment. Nor was it necessary for the cities to pass any legislation or ordinance regarding the bridge; the state had taken care of that. In fact, the only regulation to which the bridge finally had to submit was national; an Act of Congress in 1869 established the bridge as a lawful post road, providing that the Secretary of War approve the plan and site. A commission of three Army engineers required an increase of five feet in the height of the span. No other public scrutiny of the Company's plans seemed necessary.⁵

II

Roebing read his report at a meeting of the Company in September, 1867. It was carefully prepared as a persuasive document, and so, its specific rhetorical appeals to its immediate audience - all of them investors - are a significant aspect of the paper. Furthermore, because Roebing had complete freedom in

⁵Roebing himself requested that the Company appoint a Board of Consulting Engineers, consisting of seven established professional engineers, to approve the plans. His motive was mainly public relations, to overcome the skepticism of such figures as Horace Greeley and the mayor of Brooklyn. See Steinman, p. 317.

his report, his plan shows his grasp of urban realities and possibilities, his conception of the city as it was and as it would be with his bridge.

Perhaps the foremost appeal for the group of capitalists assembled to hear the report was the sense of power which Roebling conveyed; he showed his ability to plan and accomplish swiftly and efficiently. The resistances the engineer dramatized in his report were mainly physical ones, of space and matter, and against these, he had a free and sure hand. He worked within clearly established possibilities. Firmness and clarity, Roebling knew, were his best arguments. However, Roebling spoke to his audience not only as investors, but as citizens as well. For the engineer, with his own roots in the old German trading town of Muhlhausen, civic beauty bespoke civic pride. Civic beauty, furthermore, was to him not merely a matter of a traditional facade, but of mass and space. Roebling tried to expand the vision of his audience so that they could see the bridge in its many aspects, as a utilitarian, profitable, and monumental work of urban engineering art.

An example of Roebling's carefully reasoned persuasion, linking beauty with utility and profit, is his argument concerning the choice of location. After reviewing several alternatives, he said:

The occupation of valuable property is an important item in these comparisons. The Park line recommends itself as the true line of the Bridge on account of the location of its New York terminum, opposite the Register's office, in the Park. This point will collect and accommodate more travel than Chatham Square. . . For the next fifty years to come, the City Hall Park will remain the great focus of travel, from which speedy communications will ramify in all directions. . . It also so happens that much less valuable property will be occupied on this line than any other. Should the building of the bridge go hand in hand, as is proposed, with the improvements of the ground underneath, then indeed this work will greatly beautify and improve this part of the city, which appears to need it more than any other.⁶

This passage is typical of the themes and tactics of the entire report.

Roebling never mistakes the bridge as anything but, in essentials, a bridge for heavy traffic. But, at the same time, it occupies a specific space, and over and beyond practical considerations of convenience and efficiency, it has a humane obligation to keep that space orderly.

Roebling's design of the roadway shows the same dual approach. The floor was divided into five distinct spaces or lanes, each a separate thoroughfare with a separate function. The two outer lanes were for horse-drawn vehicles; the two inner lanes were for mechanized trains. The fifth lane, raised in the center over

⁶Report of John A. Roebling, C. E., to the President and Directors of the New York Bridge Company, on the proposed East River Bridge (Brooklyn, 1867), p. 19. All page references are to this edition.

eighteen feet above the traffic, and commanding an unobstructed view of the river, was a boardwalk for pedestrian traffic. The purpose of the entire roadway was to accommodate the multiple demands of metropolitan life. First, "rapid transit." "To the American business man," Roebling said, "time is money." He continued:

He will not hesitate to pay a charge of five cents for one mile of steam travel, when he can traverse this distance, from the centre of one city to the centre of the other, inside of five minutes; and when he is also sure that his conveyance is always at his command, day and night, and that he may ride in comfortable cars, protected against the inclemency of the weather. (p. 46)

This, for the Gilded Age. Roebling explained his design for a steam-cable system of bridge rail cars which would shuttle regularly across the structure. He stressed, in almost a modern time-study manner, the efficiency of loading and discharging passengers at the terminals at brief intervals. Then, harking back to a favorite argument for internal improvements, he raised the image of foreign invasion, and showed that the bridge could handle on all its roadways about half a million soldiers and citizens in one day. He assured his audience that forty million people could use the bridge annually, "without confusion and without crowding." Traffic needs were about to multiply at a staggering rate, he told his audience, and the bridge "will simply provide for the future increase of travel." Moreover, each unit of traffic represents a unit of revenue for the Company.

But city life had another, non-utilitarian aspect for Roebling.

Of the central division of the roadway, Roebling wrote:

This part I call the elevated promenade, because its principle use will be to allow people of leisure, and old and young invalids, to promenade over the Bridge on fine days, in order to enjoy the beautiful views and the pure air. I need not state that in a crowded commercial city, such a promenade will be of incalculable value. (p. 18)

Furthermore,

Every stranger who visits the city will at least take one or two walks on this promenade, and the receipts of the Bridge Company from this source alone will be quite large. (p. 18)

The bridge, then, will provide for the crowds, the commerce, and the leisure of the city. It would be, as an earlier engineer wanted his East River bridge to be, a boulevard; "of the same width as Broadway," Roebling wrote, "the Bridge will form a great avenue between two cities."

As for the strength of the bridge, this too had its magnificence. Roebling spoke with the confidence of nineteenth century building technology. He knew his materials and his forms, his weights and his stresses. The durability of the bridge was a matter of exact calculation, and this, too, his audience could well understand. Roebling spoke first of feet and tons; the central span would reach 1600 feet from tower to tower, and the total weight of the structure would be almost 5,000 tons. Could a structure of that size support such a

weight? Roebling was firm and decisive: "Any span inside of 3,000 feet is practicable." (p. 10) And with steel - a radical proposal in 1869 - the strength of the structure is vastly increased. Increase the strength, and you can increase the length. Roebling spoke in this way of investments and returns, calculating his profits in units of feet and tons.

One of the difficulties the engineer faced came from the heavy winds that swept in from the bay. Roebling met this challenge. He wrote, "A most powerful element of resistance to storms will be found in the great weight and inertia of the cables, and of the whole structure." (pp. 23-24) But, he assured the Company, he would not rely upon weight alone. In his earlier bridges, Roebling had worked out a system of diagonal stays which radiated from the towers and connected with the stiffening trusses which ran the length of his spans. These stays not only increased the total weight, but also relieved the cables of some of their load-bearing work. It was something like tying a package in every possible way to guarantee its safety. For this bridge, Roebling planned four cables and 280 stays. He gave so large a proportion of the necessary supporting strength to the stays because of the severe gales in New York harbor. He said, "I have planned the East River Bridge with a special view to fully meet these destructive forces." (p. 24).

The strength of the cables, the stays, and the super-structure was one matter; that of the towers, foundations, and anchorages were quite another. In the first case, stiffness in relation to curves, verticals and diagonals was the chief concern. In the second case, plain force and mass count most. The towers and anchorages would be of masonry, and so their bulk alone would make their strength apparent. In describing these masonry elements, Roebling continued to combine utility, cost, and beauty. The towers, he began, will be "the great feature of the work." (Figure 4) They would be immense, over 271 feet high; a balustrade and ornamental blocks would cover their top (these were omitted from the final design). The towers would have three pre-dominate shafts to carry the cables; below the floor, the shafts would be connected by walls, which would be omitted above the floor to permit two large openings for the traffic. These openings would continue up over 120 feet, "in the form of pointed arches."

It is important, he told the Company, that "in a work of such magnitude, and located as it is between two great cities, good architectural proportions should be observed." But expense also had to be considered. The shafts, for example, would have projecting buttresses "for the purpose of saving masonry, to gain strength, and to improve their architectural appearance." Also,

although the stone will be of good quality, "no expensive cutting. . . will be required in the masonry; a draft will be cut around the margin of each stone, and the face between will be simply cut down to a uniform, but projecting level." Thus, "the impression of the whole will be that of massiveness and strength," (p. 26)

The anchorages would also be imposing heaps of masonry, about 90 feet high. He described his own patented system of anchorage, involving anchor chains and a massive anchor plate, "which supports the superincumbent masonry, whose weight must be great enough to balance the greatest tension to which the chain can ever be exposed." He explained how he forced the anchor chain into a curved position, thus converting some of its tension into pressure directly upon the wall, and thereby reducing the strain from the cable to the anchor plate. Thus the cables of the bridge would be fastened on shore in the most secure, the most imposing manner. In the anchorages, the bridge itself culminated safe and sound; they connected the rainbow span with the forces of earth itself.

III

The anchorages had another value, Roebling hastened to explain. Two large spaces were to be left open in each wall, and these spaces could be "improved and utilized to an excellent purpose, so as to bring a higher rate of rent," (p. 36) Here Roebling

described a careful plan for exploiting this space, a plan which shows how well he understood his audience. He proposed that the open space next to the huge anchor plates be used as treasury vaults. They would be unequalled, he said, anywhere on the continent. "No city in the world would possess treasury vaults of equal strength, safety and security against fire as well as burglary." This was obviously a favorite project of Roebling, and he expanded upon it.

An objection may be raised, that the localities of these vaults will not suit for daily commercial transactions. This is true, but bankers and capitalists do not keep their funds and treasures afloat all the time; permanent investments in stocks and bonds are not overhauled every day, but only handled once in six months, when coupons are due. It is for the safe keeping of such securities, which now amount to thousands of millions, and are ever increasing, that vaults are required, which will guarantee absolute safety. These vaults once established, and placed under good management, would soon be filled with three-fourths of all investments, now held in this country. (p. 36)

A bridge anchored on the wealth of the nation - here indeed was an American monument.

Roebling would not waste an inch if he could help it. But his sense of order was meticulous and responsible. For example, he planned the physical contact between the bridge and the cities with great care. The point at which the bridge touched the city streets was a crucial one. In his 1864 proposal, Roebling saw his structure

sweeping in a graceful arch from city hall to city hall. If these city halls had also been civic centers in the European manner, the solution would have been easier. He would have had more room, and then too, he more than likely would have had more co-operation in preparing the area to receive such a formidable intruder. As it was, he was able to plan only the elevated approaches to the central span of the bridge.

The ground taken by the approaches, he said, was valuable "and should not be sacrificed, but on the contrary utilized. . .My plan contemplates no sacrifice. . .but involves, on the New York side at least, a decided improvement of all the blocks which will be passed over." (p. 37) A new street would be made along side the New York approach; this will face the row of masonry arches, making "the Bridge front of the new street. . .very imposing and attractive in its architectural features." But there was little else he had the power to design. In Roebling's following remarks, we sense his frustration; obviously, the logic of his grasp of the new urban form of the big traffic bridge led him to recognize, as most architectural writers now realize, that piecemeal planning of urban developments is wrong and irresponsible. Any single structure, he realized, should be viewed within its total setting, as part of a complex. Roebling pointed out that the bridge charter did not authorize other improvements and new streets; he hoped nonetheless that the

Company would apply for these powers, or that, at least, a separate improvement company be formed. He wrote:

It so happens that this part of New York has been very much neglected. The blocks are densely crowded by the poorest class of buildings, the removal of which will be desired by every citizen who feels an interest in general improvement of the city. No other line could be located which would occupy ground and buildings less valuable than on this approach. And indeed it appears a most remarkable circumstance, that so much ground, situated as it is between the City Hall Park and Franklin Square, although somewhat low, should have been left so long and so thoroughly unimproved. It is desirable that the construction of the Bridge and of the improvements underneath should be carried on simultaneously, and upon one and the same plan.
(p. 37)

Roebbling hoped that the bridge would restore a sense of place and function to the city. He suggested the development of civic centers. He proposed "a good market hall" to replace the old Fulton market, and "to better serve a vast and dense population all around within a radius of half a mile. This hall would be most convenient for all the marketing which will come over the Bridge from the Brooklyn side." (p. 39)

Roebbling saved his best argument for the end, under the heading of "Estimate of Cost and Revenue." In this section the two themes of utility and beauty come together to justify not only a bridge, but a monument. Roebbling used the familiar language of Manifest Destiny. His version of the economic side of

of the argument begins by pointing out that the bridge is necessary in the first place because of the increase of population and wealth in New York. This increase, however, is in turn a sign of a shift of the center of civilization from Europe to America. The bridge is made necessary, in short, by a historical movement. The final act of that movement, Roebling pointed out, would be the union of east and west through the Pacific Railroad (this happened in 1869, the year Roebling died, and the year bridge construction began). He pointed out the significance of that act.

After the completion of the Pacific Railroad, a great change will take place in the commerce of the world. This change will at first be very slow, but the breadth and depth of this new commercial channel will increase with every coming year, until at last the city of New York will have become the great commercial emporium, not of this continent only, but of the world. . . This is no futile speculation, but the natural and legitimate result of natural causes. As the great flow of civilization has ever been from East to West, with the same certainty will the greatest commercial emporium be located on this continent, which links the East to the West, and whose mission it is in the history of mankind to blend the most ancient civilization with the most modern. The old and new are to meet on this continent, and this will be effected through the means of commerce. (pp. 40-41)

Three years later, Whitman published Passage to India, expressing in verse what Roebling hoped to express in stone and steel. The bridge, Roebling implied, was made necessary by the orderly currents of history, and it would celebrate those currents.

Roebbling then turned to the practical implications of history. For Brooklyn, the outlook was hopeful; it would thrive as a preferred place to live as soon as there were adequate transportation facilities. "As sure as the Bridge is built," forty million people will pass over it annually. "When the Bridge is completed, they will make their appearance in due time, because they will simply form a portion of that natural and legitimate increase of population of the whole country, which will have centered about New York." (p. 44) The bridge revenue, as part of the "natural and legitimate" wealth of the cities, will "be so immense, that the Bridge Company in a few years after the completion of the work, will feel justified to put up great magnificent depots and portals at both termini, which shall be a credit to the two cities. (p. 47)

Roebbling's report partakes of the optimism of the post-Civil War period. He foresaw unlimited growth and expansion, and in his eyes it was good. He converted the figures into profits for the Company, and weights for his bridge. His report is both concrete and visionary. The Preface to the Report serves as an appropriate conclusion:

The contemplated work, when constructed in accordance with my designs, will not only be the

greatest Bridge in existence, but it will be the greatest engineering work of this continent, and of the age. Its most conspicuous features, the great towers, will serve as landmarks to the adjoining cities, and they will be entitled to be ranked as national monuments. As a great work of art, and as successful specimen of advanced Bridge engineering, this structure will forever testify to the energy, enterprise and wealth of that community, which shall secure its erection.
(pp. 3-4)

The bridge would be not only the crowning work in the career of one of America's leading builders, but also the crowning work of a crucial phase of American development. In its monumental aspect, it would serve an entire culture.

CHAPTER V

THE MONUMENTAL ASPECT: THE TWO STYLES OF BROOKLYN BRIDGE

Monumentality in architecture may be defined as a quality, a spiritual quality inherent in a structure which conveys the feeling of its eternity, that it cannot be added to or changed. We feel that quality in the Parthenon, the recognized architectural symbol of Greek civilization.

Louis I. Kahn, "Monumentality."

Monumentality, because of its inherent character, can seldom be used and then only for the highest purpose.

Sigfried Giedion, "The need for a new monumentality."

In John Roebling's mind, Brooklyn Bridge had two functions. It was a traffic bridge, the largest, safest, most advanced in the world. It was also a symbol, a plastic testimony to the American values of "energy, enterprise, and wealth." The central span, strung across the river on massive cables and secured in place by a web-like network of diagonal stays, served the first function; the great masonry towers, meanwhile, served the second function. As Roebling reported to the bridge company, the towers would be the "most conspicuous features" of the bridge, and would quickly become national monuments. The towers, it is clear, rather than the span, raised this mechanical structure to the rank of art in the mind of its creator.

Twentieth century admirers of the bridge have not followed Roebling's thinking. In fact, we tend to take an exactly opposite point of view. We are most impressed by the cables and the central span, and by and large, we regret the "symbolic" towers. The reason for this is obvious. In the towers, Roebling followed tradition; he used historical forms derived from earlier architecture, and relied upon the conventional associations with mass in masonry as well as the spiritual suggestion of pointed arches for his symbolism. In the cables and roadway, however, Roebling worked with originality. He followed only the demands of material and structure. Because the cables and the web of supporting stays express themselves, their material and their structure, so forthrightly, so perfectly, we say they, not the towers, are the beautiful parts of the bridge. From Roebling's nineteenth century point of view, the bridge is a whole unit, which is made beautiful, that is to say, made into art, by virtue of the towers. He had no way, before the popularity of functionalism, of ascribing to the cables a beauty of their own. From our point of view, however, the bridge has two competing styles. One is based on convention, the other on an original adaptation of form to function. We call one reactionary, the other prophetic.

But of course, the conjunction of two styles does not seriously damage the bridge. In fact, many admirers have taken

a certain pleasure in the historical aptness of the old and the new, the massive and the airy, coexisting in the same structure. Certainly, furthermore, the split in the bridge does not damage the reputation of Roebling. After all, what other course was open to him? The steel tower was not yet possible; he had to use masonry, the only material with enough strength in compression. Given the circumstances, including both technical and esthetic, not the least of which was the lack of precedent for such a structure, the two styles were inevitable. But we should not let it go at that. It was not inevitable that Roebling claim monumentality for his bridge in the first place. The fact that he did so, however, and chose to support his claim with Gothic forms, raises a subtle and far-reaching question. What right does a bridge, a strictly utilitarian structure, have to be a monument? A monument is a "reminder;" it is something "more" in a building which is inessential to the strict function of the building. Or, to put it differently, it has a function for its viewers as well as its users. It must be such that the vision of it is associated with ideas and feelings beyond itself. Was Roebling exceeding his own function as a builder when he designed Brooklyn Bridge, a highway across a river, as a monument?

I

In an essay published in 1843, forty years before the opening of Brooklyn Bridge, Horatio Greenough made an important distinction between two kinds of building, the organic and the monumental. The first, he wrote, is "formed to meet the wants of their occupants," while the second is "addressed to the sympathies, the faiths, of the taste of a people."¹ The first is a building mainly for use; the second, mainly for appearance. Monumental structures, Greenough pointed out, "are bound by no other laws than those of the sentiment which inspires them, and the sympathies to which they are addressed. . . . No limits can be put on their variety" (p. 65).

Greenough used this distinction to clarify his by now familiar thesis about early nineteenth century American architecture. American builders, he felt, had great opportunities to develop a native architecture, but instead, they are unduly lured by the monumental forms of European academies. The "desire of public magnificence," he wrote, has led Americans to a slavish imitation of Greek, Roman, and Gothic styles. The trouble with this is twofold. First of all, the imitations by and large have been bad; Gothic grandeur has been ludicrously shrunk to fit small wooden

¹ Form and Function, ed. Harold A. Small (Berkeley, 1958), pp. 64-65. All page references are to this edition. For a discussion of functionalist theory up to Greenough, see Edward Robert DeZurko, Origins of Functionalist Theory (New York, 1957),

churches, and Greek temples have been stripped of their lateral colonnades and their statuary. American imitations have degraded the historical forms. Second of all, and more serious, the borrowings have been immoral, for they are based on a confusion of values. For example, to build a cathedral faithfully, Greenough wrote, "demands a sacrifice of what we hold dearest. Its cornerstone must be laid upon the right to judge the claims of the church" (pp. 55-56). Trinity Church, "the puny cathedral of Broadway," yearns for "Gothic sublimity," but the "roar of Astor House, and the mammoth vase of the great reservoir" are truer expressions of a utilitarian and commercial culture. A bank should look like a bank, he wrote, and chapels and billiard rooms should not "wear the same uniform of columns and pediments" (p. 63). As it is, architects "huddle together a crowd of ill-arranged, ill-lighted, and stifled rooms and [mask] the chaos with the sneaking copy of a Greek facade" (p. 63).

especially chapter 10, "Early American Contributions to the Literature of Functionalism." I am also indebted, both for information and point of view, to Lewis Mumford, "Function and Expression in Architecture," Architectural Record, Vol. 110 (Nov. 1951), pp. 106-12, and, "Monumentalism, Symbolism, and Style," Magazine of Art, Vol. 42 (Oct. and Nov. 1949), pp. 202-7, 258-63.

Greenough's point is that a confusion of architectural styles implies a confusion of cultural values. His prescription for a healthier style, and by way of this a surer grasp of our own democratic culture, was this: "Instead of forcing the functions of every sort of building into one general form, adopting an outward shape for the sake of the eye or of association, without reference to inner distribution, let us begin from the heart as the nucleus, and work outward" (pp. 61-62). If we build our buildings as we build our ships, he wrote, we would soon surpass the Parthenon, as our clippers have surpassed the galleys of the Argonauts. We need, in short, to allow the function of our buildings to determine their form. The appearance of a building should express what the building is. The organic rather than the monumental should govern American architecture.

Does Greenough, then, reject the monumental outright? I think not. If we look again at his distinction between the two kinds of buildings, I think we will see that he actually gives each mode its own validity. What he rejects, and what most students today agree with him in rejecting, is false monumentality, inappropriate monumentality, borrowed monumentality. Paraphrasing his distinction, we can say that while organic architecture is based on form evolving from function, monumental architecture is based on a self-conscious

search for beauty beyond utilitarian needs. Monumental buildings speak not only to their inhabitants, but to the entire community as well. In his comments of the first Washington Monument, Greenough wrote, "I hold the chief value of a monument to be this, that it affords opportunity for feeling, thought, and study, and that it not only occasions these in the architect, but also in the beholder" (pp. 27-28).

In light of these comments, it is clear that Greenough saw the need to expand the idea of functionalism when it came to certain structures. Unfortunately, Greenough did not elaborate on the nature, or the possibility of monumentalism in America. If we ask, "is there an appropriate architectural language for monuments in the New World?" we get no clear answer. If, as Greenough writes, "monuments. . .are opportunities on which to hang the proofs of the development of art" (p. 29), then a genuine monument in America would have to wait for the development of a genuine and original architecture. An analogy might be the development of vernacular sailing ships into the monumental expression of the Yankee Clipper. The American problem, then, was largely a matter of cultural immaturity. It is plausible to assume that Greenough would say that American architecture would have to become genuinely functional before it could develop genuine monuments.

This is as much as to say that American culture would have to free itself of a slavish imitation of the past and develop its own organic forms, before it could achieve a characteristic expression in any area. As Behrendt puts it, "All monumental art is in the nature of a symbol, expressing, representing or recalling in its forms common ideas or conceptions of general consent, and therefore understood by everybody."² When a Greek temple becomes a bank on Main Street or a theatre in the Bowery, it becomes a devalued symbol; it does not arouse in its beholders common ideals and feelings. Conversely, without genuine symbols, there is small chance for common ideals and feelings.

The American problem, moreover, was intensified by the general problem created by technology. As Sigfried Giedion has pointed out, the nineteenth century suffered from "cultural schizophrenia;"³ while the mind followed science into new possibilities of buildings and planning, the feelings remained attached to forms sanctioned by tradition. The engineers built the important utilitarian structures with an eye only to function and serviceability, while the architects and their patrons became increasingly eclectic in the use

²Op. cit., p. 180.

³Sigfried Giedion, Space, Time, and Architecture (Cambridge, 1949), pp. 13-17.

of historical styles. The "associational" and the "picturesque," as Pevsner has written, dominated the fashionable nineteenth century architecture.⁴ In America, commercial buildings, warehouses, and department stores appeared with pre-cast iron facades disguised as palazzos.⁵ Italian villas and elaborate French chateaux became country homes in New York and Rhode Island. Washington, with its baroque plan and neo-classic facades, typified the confusion.

In reaction against this wide-spread nineteenth century situation, pioneer modernists early in the twentieth century decided to eliminate ornament altogether, to replace monumentality with a severe Sachlichkeit. One consequence of this reaction against the period of pseudomonumentality is the great admiration most moderns have for the plain, unadorned works of the nineteenth century engineers, the builders of bridges, market halls, and factories. Doing so, however, we tend to overlook the problem of genuine monumentality. This is the problem which Roebling, with his audacity to claim a symbolic function for his utilitarian bridge, gives us the chance to re-examine.

⁴Nikolaus Pevsner, An Outline of European Architecture (Penguin Books, 1957), p. 251.

⁵See Winston Weisman, "Commercial Palaces of New York, 1845-1875," The Art Bulletin, Vol. 36 (Dec. 1954), pp. 285-382.

II

Aside from the general cultural condition, Roebling, as an aspiring builder of a monument, faced another problem. How much margin of choice does a bridge-builder have to use on monumentality? His primary obligation is to build a structure that will bear a given load efficiently, safely, and durably. In satisfying this obligation, Roebling called upon all the relevant advances in the fields of physics, chemistry, and engineering; his bridge indeed is a summation of the latest stage of engineering techniques at that time.⁶ The technology that made the bridge possible, furthermore, developed along lines that had nothing to do with academic architecture. The essential design of bridges, for example, must follow certain lines of forces determined by materials, natural forces, site, and function; very little is left over for non-essentials, except for embellishments tacked onto the structure. At the same time, monumentality, as I have shown, was thought of in the nineteenth century as a matter of fixed traditional forms, such as the arch of triumph, the isolated column, the truncated pylon, and so on. Roebling's desire to build a modern bridge as a monument, it is clear, involved him in an obvious contradiction.

⁶See David B. Steinman and Sara Ruth Watson, Bridges and Their Builders (New York, 1957), pp. 205-248, for a summary of the place of Brooklyn Bridge within the development of the suspension bridge.

This contradiction was, historically speaking, a new one.

In the past, before the introduction of iron bridges in the late seventeenth century, the predominant bridge form in Europe was the masonry arch - a form which is both structural and ornamental at the same time.⁷ The use of new materials, however, created new, non-ornamental forms, mainly the truss bridge and the suspension bridge. The traditional forms belonged to masonry; the new forms were in iron and steel. Therefore, if a builder wanted his structure to be widely accepted as beautiful and monumental, he would have to find some way of using masonry in the conventional manner, or imitating masonry in iron.

The towers seemed to give Roebling his only chance to create a conventionally decorative form. They are the most plastic elements of the bridge proper (that is, excluding the anchorage and approaches, which are also of masonry). In the span, Roebling had to follow the logic of physical necessity; in the towers, he could design with a freer hand. But even here, Roebling first had to satisfy the functional needs of the bridge; the towers have a structural purpose as well as a monumental. To see just what limitations the structural purpose placed upon the monumental, it is profitable to look at the role of towers in any suspension bridge.

⁷See Appendix.

There are two factors to this role. First, the suspension bridge requires two piers strong enough to bear the weight transferred to them by the cables slung over their tops. This role does not call for any specific kind of material; it calls merely for a requisite strength. Wood, iron, stone, and steel have all been used in the short history of the suspension bridge. Second, each particular material has its own nature, and so, each requires a different construction technique and design in order to serve its function. Steel, for example, is immensely strong in compression, but only up to a certain point; thus, steel towers require a foundation design which permits a flexible bending movement, while stone requires weight and absolute stability.⁸

The structural problems, then, are completely in the realm of engineering. When steel could be used in the towers, in the twentieth century, the suspension bridge presented a homogeneous appearance of lightness. With steel, the esthetic problem as well as the structural became a matter of engineering; it became a matter of designing a continuous structure whose lines are the unadorned expression of structure. Before the development of the steel tower, however, the esthetic problem was unavoidably in the

⁸See, on the development of the steel tower, Steinman and Watson, pp. 338-342.

realm of traditional architecture. It was a matter of choosing among traditional forms. Then too, the problem was complicated by the fact that the suspension bridge tower itself was a new and non-traditional structure for architecture. There was simply no precedent for towers such as these, which in most cases stood off from shore, whose sole reason for existence was a structural one, and yet, whose bulk was the most conspicuous part of the bridge. For these reasons, the problem of monumentality was inevitably separate from the problem of structure.

The dilemma faced by the early suspension bridge builders, then, was an early symptom of the discontinuity of architectural forms which nineteenth century industrialism created. And it was a better example of the problem than the truss bridge, in which strict functionalism was usually the sole consideration. The truss bridges were primarily railroad bridges, usually placed in remote mountain passes, while the suspension bridge quite early in its career became an urban bridge. Throughout the nineteenth century, in Europe as well as America, the suspension bridge had some degree of traditional architecture. But, it is essential to remember the bridge builders did not, by and large, deliberately disguise their structures in historical costumes; usually serving as their own architects, the builders were not searching for a mask, but an acceptable shape for the necessary towers.

The search took a great variety of courses. In Europe, and to some extent in America as well, one popular solution was to adopt the decorative portal, a traditional bridge ornament since Roman days. Many early towers are carved in the shape of triumphal arches, or as pairs of isolated pylons. These portal forms, however, are appropriate only if the towers actually stand on shore, and thus serve as true portals. In most cases, however, the towers do not mark the true entrance to the bridge, but instead, as in Brooklyn Bridge, the beginning of the central span. The gate-way tower, then, is frequently a motif rather than a genuine portal. This is notably the case when, as with the Manhattan Bridge, actual portals are erected at the bridge entrance on shore. In Europe, the portal forms were frequently created in harmony with a prevailing style of architecture in the neighborhood of the bridge. This was especially true in England and Germany, where the proximity of medieval castles dictated quite specific bridge tower styles.⁹ These local adaptations, however, are of no significance

⁹A good example is the Conway Castle Bridge in Wales (1818). The bridge leads directly to the castle. The towers are Tudor gate-houses; the bridge seems a part of the castle. See Charles S. Whitney, Bridges (New York, 1929), p. 196. For other examples of Gothic tower designs in England, see Elizabeth B. Mock, The Architecture of Bridges (New York, 1949), pp. 56-57. Several nineteenth century railroad and highway bridges across the Rhine, including arch and truss bridges as well as suspension bridges, also use masonry in traditional and regional forms. See Karl

in the development of the suspension bridge tower as a structural form, but instead, indicate a transitional phase before the development of the flexible steel tower. They do, on the other hand, demonstrate a prevailing practise among suspension bridge builders of free architectural play in their masonry work.

In America, the situation was different. First, the earliest developments in the suspension bridge occurred here. While the first recorded suspension bridge in modern times was in England, over the river Tees in Durham County,¹⁰ the form was then taken up, about fifty years later, by James Finley, a Pennsylvania Justice of the Peace. Finley patented a bridge design in 1796, and built over fifty bridges from the patent until 1816.¹¹ The form became

Mohringer, The Bridges of the Rhine (Messkirch, Baden, 1931). Probably the best continental example of an urban suspension bridge using a traditional form in its towers is the Kettenbrücke at Budapest (1849). The towers are large walls pierced with single Roman arches, with an elaborate cartouche at the keystone. A classical cornice and a chimney crown each tower. See Wilbur J. Watson, Bridge Architecture (New York, 1927), p. 178.

¹⁰The Chinese had built bridges suspended from iron chains. Some of these were illustrated in Europe in Kircher's China. . . Illustrata (1667) and in Fischer von Erlach's Historical Architecture (1725). This work was translated into English in 1730, and possibly influenced the river Tees bridge. This information is found in Nikolaus Pevsner, Pioneers of Modern Design (New York, 1949), p. 71.

¹¹Condit, Op. cit., pp. 163-166.

popular in Europe after Telford's famous Menai Straits bridge in 1818.¹² With the work of Ellet and Roebling, however, the suspension bridge, somewhat like the skyscraper, became identified with America. The many bodies of waters, especially in urban areas, gave unusual opportunities for the form, which can span wide rivers and bays without obstructing water traffic. Second, America offered a somewhat freer hand in the choice of tower styles. Without a countryside filled with old buildings, and without much skill in masonry, the early builders used very simple wooden towers. For example, in his towers for a bridge over the Potomac at Georgetown in 1807, Finley used, in wood, a modified Egyptian form, with concave sides tapering to a pointed apex. In a more famous structure, the Essex-Merrimac Bridge, built by Finley and John Templeton near Newburyport, Massachusetts in 1810, the towers consist of shingled, A-shaped slabs, resting on plain rectangular piers; two very flat arches are cut through the towers to form low passageways. These two bridges are representative of the earliest American suspension spans built by unschooled inventors and

¹²See Mock, p. 55. The first French suspension bridge was built over the Rhone near Tournon in 1824 by Marc Seguin. Seguin and Telford both knew of the American bridges. Seguin was one of the first theoreticians of the form. See Giedion, p. 112.

contractors; their size, their use of wood, and their mainly rural setting gave them a plain, geometric tower style.¹³

To understand the relevance of this background to the Gothic arches of Brooklyn Bridge, we need next to see how Roebling dealt with the problem of the towers throughout his career. From his earliest bridge to his last, Roebling had an eye for non-functional beauty. With the exception of his Niagara bridge (1854), all of his work had been in large cities - Pittsburgh, Cincinnati, and New York. His first highway bridge across the Monongahela River in Pittsburgh in 1846 shows his sense of the bridge as an adornment as well as a utility.¹⁴ Built on the piers of an older bridge which had burnt down the previous year, the Monongahela bridge has eight spans and seven pairs of towers. Instead of forming arches over the roadway, the towers are separated into pairs; each cable-bearing pier is a distinct tower. A plain iron beam connects each set of towers over the roadway. The towers are quite small, only 16 feet high, and are made of four slender cast-iron columns,

¹³For illustrations, see Whitney, p. 195, and Watson, p. 176.

¹⁴For illustrations of the Monongahela, the Allegheny, and the Niagara bridges, see Steinman, Op. cit., pp. 134, 197, and 196.

slightly inclined inward. The four columns are braced at the top by an enormous casting which supports the cables in a pendulum fashion. The space between the columns is filled with decorative lattice panels on all sides. To permit a sidewalk to continue from the street along both sides of the bridge, Roebling cut through two sides of the lattice work of each tower. This opening is shaped as a low pointed arch portal, giving access to the next span, which in turn culminates in an identical tower and arched opening. Viewed from the river, the inclined columns of the towers have a truncated pyramid appearance; from the bridge, they look like small Gothic doorways.

In this bridge, Roebling effectively adapted his tower design to his material (cast-iron) and to function. The Gothic arches fit well in the tapered towers, and furthermore, they fit well with the popular taste of the Gothic revival in the 1840's. The bridge, however, is a very small one, and does not provide any adequate precedent for much larger towers. While this bridge was in construction, Colonel Ellet built the first masonry towers on the continent in his Wheeling, Ohio, bridge (1846-49). Earlier, in 1841-1842, Ellet, after his return from the Ecole Polytechnique, had built a gracious bridge at Philadelphia, with wooden towers designed as isolated classical columns, each pair standing on shore, and so, serving as portals as well as towers. (Roebling followed the same

idea in his Niagara Bridge, increasing the taper of the rectangular column to suggest a truncated pyramid rather than a classical effect.) Ellet's Wheeling towers represented a major change. They consist of two masonry pylons, connected almost to the top with the spandrels of a high rounded arch. The shafts taper both inward to the roadway and slightly toward the center of the bridge. The sides of the towers are not buttressed, and unlike Roebling's battered walls at Cincinnati and New York, the end walls of Ellet's towers form a plain, continuous line. They are very simple and very powerful, recalling the earliest wooden structures of Finley and Templeton.

At the time, Ellet's Wheeling Bridge, with a central span over 1000 feet, was the longest in the world. In a few years, however, it lost that honor to Roebling's Cincinnati Bridge, with a 1400 suspension. This bridge bears some resemblance to Brooklyn Bridge.¹⁵ The walls of the towers are buttressed and battered with successive offsets; the roof is topped with a simple, heavy cornice. Twin ornamental spires rise from the parapet above the cornice line. Because of a narrower roadway and the absence of a central pair of cables which would require a central pier for support, the towers have only one transverse arch, rather than the two of the

¹⁵Ibid., p. 260.

Brooklyn Bridge towers. All in all, the Ohio towers expand the simple elegance of the Monongahela Bridge into a much larger, more prepossessing structure. This bridge shows that Roebling had learned how to make his structure an urban ornament on an immense scale.

The towers of Brooklyn Bridge are even more immense, even more elegant (Figure 2). By scale and mass, they are impressive, more impressive than they need to be merely as towers to support the cables. For Roebling, their mass and scale as well as their design made them monuments. Their most striking features are the high pointed arches tunnelled through them. By raising the arches to such heights, Roebling accomplished two things. First, compared to Ellet's Wheeling Bridge, in which a low arched portal is cut through an otherwise monolithic wall, Roebling's towers are considerably open and light within the limits of masonry. In this sense, they intimate the lightness which steel later made possible. Second, and more significantly, the great height of the double arches within the massive towers attracts attention to the towers as forms independent of the bridge they support. They strike a dramatic outline against the sky. Resembling the long lancet windows of late English Gothic churches, the arches are not mere passageways, but monumental passageways. That is,

not only do they provide openings for traffic, but by their conspicuousness, they advertise that this is exactly what they do. Literally, they are gateways, but they are also ikons, bearing the motif of a gateway. The theme they announce to the cities is that to pass through them is something more than to pass through an ordinary doorway. The towers thus add a grandeur to the act of crossing the bridge; in this sense, it is appropriate to call them ceremonial as well as ornamental.

This view of the towers is reinforced by Roebling's report, which, I have shown, was fully as much a vision of an urban culture in the New World as a plan for a traffic bridge. The towers, he expected, would open upon the civic centers of both cities; they would supply what the cities lacked, a visual emblem which identifies their character as cities, such as the wall, the fortress, or the cathedral did for older European cities. The towers, in short, would represent the formal establishment of New York as the new center of the world, just at that moment in history when the circuit to the Eastern world through the Western seemed about to be closed. We cannot avoid reading Roebling's towers in this way, as his "passage to India" poem, his "gateway to the western world."

III

But there are other, more critical ways to read the towers. We can applaud Roebling's desire to invest his bridge with a symbolic

meaning, but we should follow this with a close look at the investiture, the style of dressing he chose. Does it fit the structure? Are the towers, with their Gothic arches, their rustication, their buttresses and their cornices, viable solutions to the architectural problem of the bridge?

I should clarify, in light of the previous discussion, what I mean by the "architectural problem." The towers, taken by themselves, are not architecture proper, but architectural forms, component parts of a larger unit (Figure 4). The architectural problem is founded on the integration of all the parts and their expression in design. That is, to discuss the towers from the architectural point of view means to discuss them in the context of the entire bridge, in light of their function in the bridge. I have shown that the choice of specific forms, the Gothic arches, the cornice, and so on, was not itself an architectural problem, but a symbolic one. Insofar as Roebling intended the towers as monuments, he chose them for their non-functional associations, not for their architectural relevance. This shows how separate in his mind were the problem of monumentality and the problems of structure. Now it is true that the precise forms he chose have no exact precedent; they are free adaptations of Gothic arches placed within a wall that loosely resembles the Roman arch of triumph. Even though they are not literal transcriptions of earlier forms,

nevertheless, their sole *raison d'être* is their aura of historical association. This, together with their mass and scale, makes them, in Roebling's mind, monumental. If he wanted his bridge to inspire elevated feelings, he had to use familiar forms; the cables and central span gave a completely new experience to the public, and a totally original monument is a contradiction in terms. Thus, for Roebling, the problem of monumentalism lay outside the architectural problem itself. Roebling was not alone in facing this dilemma; the leading architects of the post-Civil War period were up against the same situation. Richardson, in his greatest commercial building, the Marshall Field Wholesale Store in Chicago (1885-1887) also used monumental forms from the past (although better integrated architecturally than Roebling's towers). Romanesque, in fact, was used by such men as Burnham and Root, and Adler and Sullivan in the Auditorium Building (1887-1889). The choice of the forms, however, was one thing; their specific deployment is another. The architectural problem of the bridge, then, is this: how well do these particular forms fit the structure as a whole? Does the bridge deserve the epithet "monument" by virtue of its entire architectural realization, or merely by virtue of its use of traditional monumental forms?

The most thorough-going analysis of the bridge from this point

of view was written in 1883, on the occasion of the Opening Ceremonies. Its author was Montgomery Schuyler, and the essay, "Brooklyn Bridge as Monument,"¹⁶ This study was one of Schuyler's earliest of a long list of architectural reviews, which comprise a remarkable body of functionalist criticism during the early years of modern architecture in America. Schuyler carried on the tradition of Greenough; his major theme throughout his writings, as he put it in 1892, was that

the real, radical defect of modern architecture in general, if not of American architecture in particular, is the estrangement between architecture and building - between the poetry and the prose, so to speak, of the art of building which can never be disjoined without injury to both (p. 96).¹⁷

Schuyler saw the separation between the engineer and the traditional architect, between science and art, as the crucial fact of modern building. Not only that; the separation was also, he saw, a crucial fact about modern culture itself. Brooklyn Bridge, with traditional

¹⁶Originally published in Harper's Weekly, Vol. 27 (May 26, 1883), p. 326. Most recently reprinted in Montgomery Schuyler, American Architecture and Other Writings, ed. William H. Jordy and Ralph Coe (Cambridge, Massachusetts, 1961), Vol. II, pp. 331-344. All page references are to this edition.

¹⁷The most important sources of Schuyler's ideas are the architectural morality of Ruskin, the discipline of picturesque details into simple compositions of Richardson, and the structural rationalism of Viollet-le-Duc and Eidlitz. It is unlikely that he knew Greenough's work. See Jordy and Coe, Vol. I, pp. 1-95.

masonry art in its towers and modern engineering skill in its cables and roadway, helped Schuyler formulate this point of view. The significant fact about the bridge, he felt, was that while the superstructure of cables and roadway was a superb example of form following function, the towers were crude, poorly designed examples of traditional architecture.

Schuyler thrilled at the sight of the superstructure. He wrote that the "skeletonized structure in which, as in a scientific diagram, we see - even the layman sees - the interplay of forces represented by an abstraction of lines" is as perfect as "an organism of nature" (p. 343). He continued: "The designer of the Brooklyn Bridge has made a beautiful structure out of an exquisite refinement of utility, in a work in which the lines of force constitute the structure" (p. 343). On the other hand, we have the masonry towers, devoid of any expression of their function as towers. The modeling, he pointed out, does not bring out their anatomy. Instead, the towers are impressive only in their mass and magnitude, which, through centuries of association, man has come to identify with strength. The trouble is that Roebling worked in two separate capacities when he designed his bridge. As an engineer, he knew perfectly how to deal with materials and forms in an undisguised way; as an architect, however, he was able to give his masonry only the impression of mass, nothing more. "Where a more massive material forbade

him to skeletonize the structure, and the lines of effort and resistance needed to be brought out by modelling, he has failed to bring them out, and his structure is only as impressive as it needs must be" (p. 343).

Schuyler gave over most of his essay to a careful analysis of the tower design; he showed that the engineer's conventional "sense of beauty" contradicts his more perfect sense that "the function of an organism, in art as in nature, must determine its form." What is the function of the towers? They exist, Schuyler pointed out, simply to carry the cables. Three isolated piers would have done that job effectively. However, in order to stiffen the piers, and to increase the area of wind resistance, it was necessary to close the space between the piers, high above the roadway. Roebling did this by use of pointed arches, the spandrels of which form a wall which reaches to the top of the piers. A flat corniced coping covers the entire roof, joining the piers and the walls, and flattening the three piers into a monolithic structure. In this, Schuyler wrote, "there is a woeful lack of expression. . . The piers should assert themselves starkly and unmistakably as the bones of the structure, and the wall above the arches be subordinated to a mere filling" (p. 336). Also, the wall should be more decisively withdrawn from the face of the piers, and most of all, "it should be distinctly dropped

below their summits instead of rising to the same height, and being included under a common cornice" (p. 336). The design of the towers, in short, conceals the true structural reality of their parts.

An even more serious concealment, Schuyler felt, was the flatness of the top. The cables, he pointed out, rest on saddles, on which they move freely to keep their pressure constantly vertical upon the piers. But, he wrote, "the design of the piers themselves tells us absolutely nothing of all this. The cable simply disappears on one side and reappears on the other, as if it were two separate cables, one on each side, instead of one continuous chain" (p. 337). Again, this points to the chief contradiction of the bridge; the cables and their saddles represent "an exquisite refinement of mechanical arrangement," while the masonry design shows "absolute insensibility to the desirableness even of an architectural expression of this arrangement" (p. 338).

Schuyler took up each architectural detail of the towers in turn, and found each to fail. The buttresses and offsets, for example, are ineffectually modelled. The buttresses are not real, but merely shallow strips of pier. The offsets should have more accent and emphasis, which could have been accomplished by more decisive modelling, increasing the depth in proportion to the width. This would have created "higher lights and sharper shadows," and have

made "forcible masses of what are now ineffectual features. . . merely long batterings of the wall" (p. 338). The arches, too, suffer from Roebling's crudity; they are merely "tunnelled through the mass," instead of being developed by "emphatic successions of withdrawal." They are merely impressive measurements; they are "not felt as a poetical impression" (p. 341). In sum, the towers are dead and spiritless.

These are severe criticisms; the bridge stands accused of "architectural barbarism." This is not because the towers offend "taste," or at least not completely that, but because they offend their own function. They do not express the work they do as integral parts of the bridge. Significantly, Schuyler does not blame Roebling for this failure; he blames the age. Expressing two different notions of beauty, one in metal, the other in masonry, Brooklyn Bridge, Schuyler said, is a symptom of "the spirit of the age." Roebling, the world's leading builder of suspension bridges, had worked as best he knew how. His best - the age's best - was not good enough to produce a truly integrated work of art. The bridge's "defects of design are not misdeeds, but shortcomings" (p. 342). The chief workmen of the age - the engineers - were not adequately trained in sound architectural principles, which would teach them how to design their structures so that form would clarify and express function.¹⁸

¹⁸See "Art in Modern Bridges," Ibid., pp. 354-372.

The separation of art from science, in other words, prevents the works of science from achieving the expressive form they need.

This is a particularly serious problem, because the major structures of modern times are utilitarian structures. Consider, for example, Schuyler says, how curious it is that Brooklyn Bridge be called a monument.

It so happens that the work which is likely to be our most durable monument, and to convey some knowledge of us to the most remote posterity, is a work of bare utility; not a shrine, not a fortress, not a palace, but a bridge. This in itself is characteristic of our time (p. 334).

Furthermore, it is a monument treated in a utilitarian manner, with small regard for architectural refinements.

Schuyler explains this state of affairs by use of a favorite notion among functionalists of his period, especially his friend, Leopold Eidlitz. That is, modern architecture, hampered by eclecticism on one side and industrialism on the other, represents a falling away from the high ideals of Gothic building. For Eidlitz, Gothic was the "most perfect system known to art," because structure and function were fully articulated in form.¹⁹ The builder and the

¹⁹*Ibid.*, p. 29. Schuyler reports that Eidlitz admired Brooklyn Bridge, but also deplored the towers. In fact, Schuyler writes, Eidlitz offered through a mutual friend to model the towers for Roebling; the friend, however, declined to pass on the request out of regard for Roebling's feelings. Schuyler laments this: "It was a great pity. . . If he had done it, the towers would not now stand as disgraces to the airy fabric that swings between them." p. 154-44.

artist were one person, usually anonymous, and his art kept pace with his changing technology. Thus, writes Schuyler, "that paragon of construction skill, a Pointed cathedral," was the ideal functionalism.

The work of the medieval builder in his capacity of artist was to expound, emphasize, and refine upon the work he did in his capacity of constructor, and to develop and heighten its inherent effect (p. 335).

Schuyler fails to realize, of course, that modern construction technology was vastly more complex and more radical in its implications than medieval technology. But, historical accuracy aside, the image of Gothic unity was a necessary one for Schuyler and his associates; it at least defined an ideal against which to measure the leading works of the present. Against that ideal, Brooklyn Bridge shows the two capacities of builder and artist split apart; one makes the towers, the other makes the superstructure. The result is a modern monument, which, in its very magnificence, expresses the troubled spirit of the age.

IV

Schuyler concluded that Brooklyn Bridge "is a noble work of engineering; it is not a work of architecture" (p. 334). He does not condemn Roebling's choice of Gothic forms for the towers; instead, he charges Roebling with an inability to work in the true Gothic spirit. Schuyler's treatment of the bridge is certainly a

biased interpretation based on his own notions of architecture and modernity. By granting the bridge that interpretation, however, he acknowledges its importance as a monumental structure. And in spite of a rather vague idealization of Gothic, his analysis of the towers does indeed make a convincing point. But Schuyler's analysis is incomplete; he does not pursue the problem of the two styles beyond a rather general description of the superstructure. He implies that the monumentality of the bridge resides in the cables and central span. Yet, if this is true, it is in spite of Roebling's intentions. This raises the question, is the engineering part of the bridge beautiful by design, or by a physical "accident?" In brief, what kind of monumentality do the cables, the web of suspenders, and the roadway actually possess?

Discussing the famous Clifton Suspension Bridge at Bristol (1829-1836) by Brunel, Nikolaus Pevsner writes, "It seems hardly admissible that the beauty of such a structure should be purely accidental, that is the outcome of nothing but intelligent engineering. Surely, a man like Brunel must have been susceptible to the unprecedented esthetic qualities of his design - an architecture without weight, the age-old contrast of passive resistance and active will neutralized, pure functional energy swinging out in a glorious curve. . ."²⁰ Can the same be said for Roebling? It is hard to

²⁰Pevsner, Pioneers of Modern Design, p. 72.

imagine otherwise. Although the catenary curve is in its nature pleasing to our eyes, a less sensitive builder could have botched the job. Certain touches, such as the dropping of the cables below the level of the roadway at dead-center of the central span, and the terminal curves of the cables from the towers to anchorages, we feel to be aesthetically right. But these touches, along with the major features of the superstructure, exist not because they are beautiful but because they are structurally necessary. We have no way of knowing, except by guessing, whether Roebling remembered from Emerson the idea that the beautiful rests on the foundations of the necessary.²¹ All we can do is analyse the structure of the cables and roadway, and surmise from that the degree of Roebling's conscious functionalism.

The remarkable beauty of the superstructure of Brooklyn Bridge, and what sets it apart in appearance from later, more

²¹Functionalism was discussed by engineers as well as architects, and Roebling was quite likely in touch with these ideas. For example, in 1842, the Englishman, William Hosking wrote: "The usual materia architecturae are entirely out of place, and out of character, in bridge composition. . . If a work such as a bridge be well composed constructively whatever may be the constituent material or materials employed, and whatever may be the kind of construction, it can hardly fail to be an agreeable object for it will certainly possess the essentials to beauty in architectural composition, simplicity and harmony. . . It is impossible, therefore, to draw any line between the constructive and the decorative, or what is commonly termed the architectural composition of a bridge." Theory, Practise and Architecture of Bridges (London, 1842). Quoted in Watson, pp. 98-99.

ambitious bridges, comes from the arrangement of diagonal stays radiating from the towers; the diagonals cross the vertical suspenders to form a web of triangles and diamonds (Figure 3). These stays are perhaps the most thrilling expression of functional beauty in the nineteenth century. They serve no other purpose than to stiffen the roadway by forming a truss between tower, cable, and roadway; by so doing, the diagonals relieve some of the roadway-bearing weight from the cables. They stiffen the span against the danger of oscillation, which, in suspension bridges, amounts to self-destruction through waves of vibration along the vertical suspenders. Diagonal stays were used by Roebling in his earliest traffic bridge in Pittsburgh, and they became his signature. He defended their use whenever he got the chance. For example, in his final report on his Ohio bridge, Roebling wrote about the stays:

Thus a network is formed that occupies the same inclined plane which coincides with that of the cables. . . The office of these stays is twofold. They not only assist the cables powerfully in the support of the bridge but they also supply the most economical and most efficient means for stiffening the floor. Every stay constitutes the hypotenuse of a rectangular triangle, whose short sides are formed by the tower and the floor. . . This looks like a very simple proposition indeed, and is readily comprehended by sailors, who are accustomed to stays on board ships. . . I have always insisted that a suspension bridge built without stays is planned without regard to stiffness, and consequently is defective in a most important point.²²

²²Quoted in Steinman, p. 285.



Roebeling in this passage describes the structural role of the stays; he says nothing about their beauty. But the structural function itself places the stays in such a position, that they dramatize the tensions upon which the life of the bridge depends. They translate, so to speak, the abstract relation of forces which support the bridge into a tangible and visual form.

The stays do their esthetic work from two distinct points of view. Viewed laterally, from a distance, the flow of stays from tower to roadway suggests a perpetual passage of power from the towers to the cables, as though the point of contact between cable and tower and stays were the source of strength. In other words, the stays convey the movement from the vertical of the towers to the catenary of the cable in precise mathematical phases. There is another way of viewing the bridge, and that is from the roadway itself. The promenade, in fact, makes available a truly unique experience. The promenade is elevated above the traffic; it is wide enough for benches, and it widens to form a balcony around each tower. In other suspension bridges, the only foot passage is a narrow gangway along the side of a heavily trafficked roadway. Here, the promenade is flanked by the two center cables, which, together with the vertical suspenders and the stays, creates the distinct illusion of enclosed space. The proximity of the cables permits the walker to follow with his eye the upward, and then downward

swoop of the cables, giving him an immediate sense of the physical forces of the bridge; he can, if he wants, touch the cables. Furthermore, the web formed by the diagonals and the verticals makes this physical awareness of the bridge quite compelling. Each diagonal is lashed to the verticals it crosses in a series of iron knots; these knots unavoidably catch the eye as one strolls along the promenade, and with each successive step, the eye is tempted to follow the upward sequence of knots, until, if you are walking from the shore, you reach the first tower balcony. There the eye is at the peak of the triangle of cable, tower, and roadway, swept there by the rising knots of the diagonals. The roadway, meanwhile, has been rising slowly in its own right, in a very slight bow. The climax of the tower-cable peak is at the exact point where the arch of the roadway becomes most pronounced and begins its stretch to its own climax at the center of the bridge. As the walker passes around the center pier of the tower, under one of the massive stone arches (another temptation is to linger on the balcony, gazing up at the arches, touching the granite, and reading the commemorative plaque on the pier), the diagonals begin their descent. Now, a subtle dialectic occurs between the descending motion of the cables, reinforced visually by the diagonals, and the upward slope of the promenade. At the very center of the bridge, the cables descend below the roadway, out of sight altogether, and the walker is left

on a clear plateau of several yards at the highest point of the promenade. Here the bridge itself demands a pause, a rest to acknowledge this phase of the experience - if not merely to take in the expansive view of the harbor, bay, sea gulls, and the New York skyline. As one continues, the same upward-downward motion begins again, up to the next tower, and then, finally, down into the city. If one has been walking from Brooklyn to Manhattan, the dark opening of a subway concourse will greet the stroller, accentuating the transition between bridge and city.

What happens in even the most casual stroll across the bridge is that the bridge controls the walker, seems to measure his paces with its own precise rhythm of diagonals and verticals. I doubt that Roebling deliberately planned this effect when he designed his stays. But the complete functional honesty of his treatment created a street across the river which indeed was an escape from the "crowded commercial city." The experience of the bridge is such a contrast with the typical New York street, which was designed for vehicles, not for people, that it is easy to understand the feeling of relief, of escape from the turmoil of the city, which many people associate with Brooklyn Bridge.

The kinetic aspects of the bridge, together with the visual effect, provide a unique experience. Historically speaking, these features make the bridge truly prophetic of the new sensations that

the new technology made possible. This gives the cables and roadway its monumental aspect. Here, of course, I am speaking from a modern point of view. But there is no way of getting around the two styles of Brooklyn Bridge. For Roebling, whatever elevated feelings the engineering aroused were not enough for monumentality; he needed the heroic image of the towers as well. The towers, we should recognize, do not detract from the experience of crossing the bridge; to pass under the huge arches is itself a notable event. It would be foolish to dismiss the towers as reactionary hangovers. Although, as Schuyler points out, their execution is flawed, they testify to the fact that one of the most impressive mechanical structures in America also wanted to be a monument.

The conjunction of two styles in Brooklyn Bridge is Roebling's attempt, on the threshold of the modern period, to fuse the new and the old, the new functions and new forms with old predispositions. Perhaps they do not fuse as well as we would like. But the effort itself shows that Roebling wanted to have more than a traffic bridge. The two styles tell us that monumentality is a major function of Brooklyn Bridge.



PART III

BROOKLYN BRIDGE INTERPRETED

CHAPTER VI

"A UNION OF HEARTS AND A UNION OF HANDS": THE OPENING CEREMONIES

Babylon had her hanging garden, Egypt her pyramid,
Athens her Acropolis, Rome her Athenaeum; so
Brooklyn has her Bridge.

Sign in Brooklyn shop windows, May 23,
1883

Is it the best of all possible worlds ?

Henry George, Social Problems (1883)

Brooklyn Bridge was created out of the materials which lay at hand in post-Civil War America. As a monument, it announced to the period that America had entered the age of industry and the city. At the same time, it was a tangible link with the past, the earlier period of internal improvements. The bridge, then, represented a continuous trail through American history, of tasks proposed and tasks accomplished; it stood for the historical fact that a wild continent had been subdued into a nation of cities. By designing a monument rather than a mere traffic bridge, Roebling intended that his bridge inspire important ideas and feelings about that fact. His intention has certainly been fulfilled; the admiration, not to say the love, of artists and poets, and people in general,

alone justifies the monumental aspect of the bridge. But just what is it a monument of? What ideas and feelings has it aroused? And why are they important? That is, what is the place of Brooklyn Bridge, American monument, in the minds of Americans?

Americans have always tended to view themselves metaphysically, within a cosmic context, and have the habit of assigning to events of their public life a special significance drawn from whatever metaphysic is uppermost at the time. Henry Nash Smith, in Virgin Land, has shown how the West, imagined as the new garden of the world, was just such a matrix of meanings for specific events, such as the crossing of the desert, the closing of the frontier, and so on. Brooklyn Bridge is, of course, not of the same scope nor significance as the West; but it too was translated in the minds of Americans from a mere traffic bridge to a sign of something else. It entered the mind within a texture of ideas which affectively colored the meanings attributed to it. As Mr. Smith has demonstrated, the ideas and images which a people employ to animate reality for themselves, contain a good deal of the culture, of the way of life of that people. To understand the place of Brooklyn Bridge in the minds of Americans, therefore, it is necessary to take into account the larger framework of ideas which, at least partially, supplied Americans with their view of reality in the period between 1883 and 1930.

The image of Brooklyn Bridge takes its place among other ideas related to a cardinal fact of post-Civil War life, the rise of the metropolitan city. Confronting the bridge, Americans confronted one of the new facts of their national existence. On one hand the bridge was tied up with the intrigue and corruption that stifled municipal life in New York; it was tied up with the rise of population, with the increase of commerce, with the needs of transportation. On the other hand, it was an image of promise against the confusion and bleakness of the actual city. It was possible to view the bridge as an example of how technology and civic organization could produce fine things in America. All in all, the bridge was inseparable from the life it served; the real city delivered the bridge into the mind as an image of the new urban America.

I do not mean to say that there was a uniform response. The image of the bridge appears in a variety of places, in "high" as well as in popular literature, in political documents as well as in newspapers, in pictures as well as words. What follows is not a complete collation of all appearances of Brooklyn Bridge; not every reference to an object so common in the daily lives of millions of people is significant for my purposes. However, in the period from 1883 to 1930, from the Opening Ceremonies to the publication

of Hart Crane's poem, The Bridge, a certain number of representative Americans expressed what the bridge, and through it, modern America, meant to them. Their views are not identical, but nevertheless, an interesting pattern of response does exist. The purpose of this section is to look closely at some of the responses in order to discern something of the pattern.

I

In April, 1883, the popular Frank Leslie's Illustrated Magazine began a series of articles called "Problems of the time" by a man with a rising notoriety in New York, Henry George. Four years earlier, George had published Progress and Poverty, a book which formulated in a mystical-economic vocabulary the compelling paradox that, as wealth increased in America, so did poverty and distress. George wrote as a western visionary who had seen the promise of the land defeated; he blamed a social system which had failed to obey the "true" laws of economy, and proposed an overall solution, the "single tax," to readjust society's relations to nature. Now, in 1883, he confronted his theme in less economic and more social terms; for the readers of Leslie's, he would hammer home the unmistakable contradictions of American life, most glaring and threatening in the big city itself. On the one hand, he pointed out, there was rapidly increasing power in the form of machines and

organizations; on the other hand, just as rapidly increasing distress, injustice, poverty, and corruption. Social intelligence, George argued, was not keeping pace with technological intelligence. And what more apt, more timely example of the confusion than New York's new bridge, which after thirteen years of construction, still hung in a cloud of uncertainty. He wrote:

We have brought machinery to a pitch of perfection that, fifty years ago could not have been imagined; but in the presence of political corruption, we seem as helpless as idiots. The East River Bridge is a crowning triumph of mechanical skill; but to get it built a leading citizen of Brooklyn had to carry to New York sixty thousand dollars in a carpet-bag to bribe a New York alderman. The human soul that thought out the great bridge is prisoned in a crazed and broken body that lies bed-fast, and could only watch it grow by peering through a telescope. Nevertheless, the weight of the immense mass is estimated and adjusted for every inch. But the skill of the engineer could not prevent condemned wire from being smuggled into the cable.¹

Henry George could hardly have chosen a more effective example of what he called the "opposite tendencies" in the early years of America's technological era. The bridge, everyone agreed, was a decided good; but it was also a somewhat enigmatic one. That is to say, it was one matter to agree that a bridge should exist, and quite another one again to say how it should come into

¹Henry George, Social Problems (New York, 1883), p. 19. The smuggled wire George mentions is discussed in David B. Steinman, Op. cit., pp. 392-394.

existence and what should be its nature once it did exist. Urban society, to put the matter differently, discovered itself with the technological ability to create large-scale public works, but without the political self-consciousness to define just what "public" meant. In its ultimate value, the bridge no doubt would serve the sundry interests of the citizens; meanwhile, in the course of construction, it seemed instead to serve the pocketbooks of several notorious private citizens. Here, in the background to the Opening Ceremonies of Brooklyn Bridge, was the paradox George proclaimed; good and corruption, progress and poverty seemed the cosmic twins that presided over America's initiation into the age of machines and cities.

Two crucial facts about American municipal life become obvious through the Brooklyn Bridge. First, the arrangement which gave a private company virtual autonomy over public money was risky and unsatisfactory, and second, no clear principles existed upon which to create an alternative method of administration. The first of these facts became dramatically clear with the disclosures of Boss Tweed's connivance in establishing the bridge company, and led to legislation in 1874 which nominally gave the cities a larger measure of control over the project. This legislative action, as I shall point out shortly, did not solve the problem of public control,

and, in effect, left the management of the project in the same hands that had initiated it. Through the period of construction, from 1870 to 1883, charges of scandal, mismanagement, and graft were made against the project.

Brooklyn Bridge may have been conceived as a beautiful idea in the mind of John Roebling, but its birth required midwives with rather horny hands. And they left scars which were difficult to disguise. Much of the damage to the bridge's civic reputation was the work of its chief promoter, William C. Kingsley.² In 1882, when Kingsley was a candidate to the post of chairman of the Board of Trustees, left vacant by the death of Henry C. Murphy, the New York Daily Tribune violently opposed him in an editorial which catalogued his questionable relations to the bridge from the beginning of the project. "Mr. Kingsley," wrote the Tribune on December 8, 1882, "has been the very centre of every scandal that has clustered about this undertaking, and the number has been legion." The project began, the Tribune accused, as a scheme out of the "monstrous union of the New York and Brooklyn Rings," and Kingsley was "the chief procurer of that foul and abominable alliance." This was strangely vituperative language concerning an

²On Kingsley's associations, see Harold Coffin Syrett, The City of Brooklyn, 1865-1898 (New York, 1944), p. 75.

event of thirteen years past, but the bridge was still unfinished and the rumors of its shady beginnings still echoed. In 1878, Boss Tweed had revealed his role in the launching, and he implicated Kingsley in no uncertain terms. Tweed told that in return for an eighty per cent reduction in the price of the stock he personally purchased in the bridge company, he permitted Kingsley to get a fifteen per cent commission on the material purchased.³ Tweed also revealed that he was the chief instrument in getting the New York council to issue bonds for a million and a half dollars, the amount struck upon by the bridge company as New York's share. He was approached, he said, by Henry Murphy, one of the chief movers of the bridge company and a state senator along with Tweed. The deposed Boss told that he demanded, and received an amount agreed upon - "it was either \$55,000 or \$65,000" - and the deal was closed.⁴

Even before Tweed's dramatic disclosures in 1878, the bridge was under suspicion and repeatedly investigated. No irregularities, however, were uncovered. But in the wake of Tweed's collapse in

³See Syrett, p. 149.

⁴Report of the Special Committee of the Board of Aldermen Appointed to Investigate "Ring Frauds" (New York, 1878), pp. 126-127; quoted in Syrett, p. 148.



1871, legislation was framed to convert the bridge project into a public enterprise. The leaders of the company did not oppose, in fact they favored this transfer of control. One reason for this was the expanding estimate of costs; Roebling's original figure of seven million dollars was revised in 1872 by his son to almost ten million (the final cost was over fifteen million dollars). The state law, passed in 1874 to amend the original charter of 1867 authorized the cities of New York and Brooklyn to acquire the stock held by private stockholders, and to acquire an additional three million dollars worth of stock. Another law passed in 1875 eliminated the bridge company altogether, and provided that the cities, through a board of trustees, take over complete charge of construction, two-thirds of the expenses to be paid by Brooklyn, one-third by New York.

Ostensibly, then, the cities were endowed by the state legislature with efficient control over their own funds. Actually, however, the original leaders of the company retained control of the Board, with its vast contract-awarding powers. Henry C. Murphy was elected President of the new Board, and Kingsley remained an active member. According to the Tribune editorial of 1882, the real power of the Board rested with the Executive Committee, in which Kingsley's voice was most influential. Suspensions

of under-handed deals and jobbery continued and the project was frequently under investigation by some group or other.⁵ Construction itself went quite slowly, impeded by the largely improvisational nature of the engineering work, by the frequent probes, and by the even more frequent lack of funds. The Board of Trustees applied for repeated appropriations from the state legislature, their only source of authorization. As late as 1882, a year before the bridge was opened, the Brooklyn Union wrote:

The Bridge is a regular suction pump. Its Treasury is always dry and there issues from it a perpetual cry for more funds. Every year the Trustees ask for a few more millions, and every year they pledge their sacred honor that not another dollar will be wanted to "complete the Bridge." This has been going on for years and promises to go on for years to come.⁶

Although they acted as representatives of the cities, it is clear that the Trustees did not enjoy whole-hearted public confidence; their autonomy in dealing with public funds placed them under constant suspicion.

The most serious attack on the bridge came in 1878, the year of Tweed's disclosures. The most tedious tasks of construction, the laying of the foundations and the raising of the towers, had been

⁵See Syrett, p. 150, and Steinman, p. 396.

⁶Quoted in Syrett, p. 151.

completed, and a temporary footbridge hung across the river as a promise. Cable spinning had already begun, but not without interruption. In July, Colonel Roebling discovered that the cable wire contractor had been practising fraud by passing off rejected wire as sound wire. After this difficulty, the spinning continued, and the cables were completed in October, but by now, with the entire superstructure yet to come, the treasury was exhausted. Two more installments on the latest state appropriation were forthcoming from the city of New York, but city Comptroller, John Kelly, refused to issue any additional bonds to raise the money. He filed an affidavit in the state Supreme Court, charging that the bridge began "as a scheme, through the instrumentality of a private corporation, to secure the expenditure and control of public funds."⁷ Eventually, the court refused Kelly's request for an injunction against the continuation of the project, but six months of work had been lost.

Public suspicion and exasperation with delays came to a dramatic head in 1882. Seth Low, the reform mayor of Brooklyn and an authority of municipal government,⁸ tried to remove the

⁷Quoted in New York Daily Tribune, May 23, 1883.

⁸See Seth Low, "An American View of Municipal Government," in James Bryce, The American Commonwealth (3 vols., London, 1888), Vol. II.

crippled Colonel Roebling from his post as chief engineer. Since his injury in the course of construction in 1873, Roebling had supervised the work from his flat in Columbia Heights, overlooking the bridge site. The original state charter had released the chief engineer from all administrative problems except those connected with actual construction. In particular, he had no hand in awarding contracts or in allocating funds. However, because of Colonel Roebling's vast powers over such an arcane endeavor as raising a giant suspension bridge, he frequently became the court of last resort in explaining to the Board and the public the details of certain outlays. The Roeblings themselves, with their great prestige, were always beyond the pale of suspicion; moreover, Colonel Roebling's personal heroism in face of his crippling injury made him all the more popular.⁹ A storm of criticism, however, finally broke upon Roebling after he requested an additional thousand tons of steel to reinforce the roadway to support Pullman cars. This was in 1881, and in 1882, charged with neglect by Seth Low, Roebling had to fight, through the proxy of his wife, to retain his connection with the bridge his father had planned and he had built.

⁹In 1876, Colonel Roebling sold out his shares in John A. Roebling's Sons, valued at \$300,000, in order to avoid suspicion of jobbery. See Steinman, p. 388.

With the support of Kingsley and Murphy, Roebling won the fight, though the vote was close, and he remained chief engineer until the bridge was completed.

Throughout thirteen years of charges and investigations, nothing substantial in the way of fraud was ever proved against the leading figures in the bridge management. Yet the suspicions and accusations continued. Even if sufficient evidence for a court of law did not exist, at least a decided frame of mind among many New Yorkers did exist to give substance to Henry George's cry that the power to create public wealth and happiness was hampered by the social and political forms of the day. Not corruption itself, such as it may have been, but the suspicion, the imagination of corruption, is our clue to the state of urban culture in New York's Gilded Age. New Yorkers were predisposed to doubt the integrity of their leaders, and this doubt was wholesale and unremitting; it rose to indignation especially when public projects, such as Brooklyn Bridge, seemed to foreshadow a permanent public works program as a source of perpetual graft. This indignation, of course, arises from the feeling that the "public good" the bridge obviously stood for, was being exploited for private gain.

But what conception of "public good" did the critics of the bridge management hold? By and large, very few specific



alternatives were proposed, except either total abandonment of the project or the replacement of honest for crooked trustees.¹⁰ Not many citizens recognized that, among other causes, the subordination of municipal autonomy to state control at Albany was one important reason the corrupt "rings" got started in the first place. What was involved, as Seth Low frequently pointed out, was the confused nature of the municipal polity in America.¹¹ The fact that the city in America had its existence usually through the legal instrument of a state charter which authorized it to act as a corporation, while the state kept control of its purse strings,¹² the fact that the city expanded rapidly in the nineteenth century without the precedents and traditions and autonomy enjoyed by European cities, and the particular fact in the case of New York city, that it surrendered its great potential power by selling its municipal lands and committing its destiny to real estate operators, all worked together to permit the "rings" to turn their tricks. These underlying facts did not emerge in the newspaper controversies about the bridge.

¹⁰Ship and warehouse owners continued to oppose the project altogether, though their voice was ineffectual. See Syrett, p. 150.

¹¹See Low, Op. cit.

¹²See Delos F. Wilcox, Great Cities in America (New York, 1906), pp. 82 ff.

Throughout the period of charges and counter-charges, of suspicions and incriminations, there was small awareness that what was at stake was a crisis in urban culture.

The terms in which the bridge was discussed were narrow ones. The predominant point of view toward the structure was entrepreneurial. That is, "utility" was defined by the standards of commercial value. This point of view, which supplied the leading motive for the bridge company in the first place, also supplied the leading accusation against the alleged crookedness of the management. Accusation was based on the moralistic distinction between "honest" and "dishonest" profit. For example, in 1882, the Tribune, complaining about the delays in construction, evoked the dark image of a secret conspiracy:

It is understood that certain men expect to make large sums out of real estate operations in connection with the bridge. They believe that when completed it will increase the value of property on the line, and adjacent to it, to a degree which will make delay a source of profit. They are in no hurry to have their work finished. They wish to perfect all their plans and get hold of the property which they desire first.¹³

Now, if this conspiratorial use of the bridge by these invisible men is wrong, then what use is right? Six years earlier, the Tribune editorialized in a different vein. That time it complained that the people of Brooklyn were too dreamy about the bridge. "Most people

¹³New York Daily Tribune, March 15, 1882.

look at the towers in a far-off way," the Tribune said, "as if the whole structure was intended as a work of art, and the towers were only to be considered monumental." This suggests, the writer continued, that these same dreamy people fail to see that the bridge "is something in which they have a direct, personal interest." This interest is two-fold; first, "the course of travel of perhaps 50,000 people" will be changed, and second, "great alterations in the value of property must result." The writer pleads with his readers to be hard-headed: "The whole question of the value of the bridge turns upon its capacity for shortening the delays of traffic." And in case the promenade might divert attention from this real function, he adds, "For foot passengers it will be of no great importance; after its novelty is over people will think a walk over the bridge more wearisome than a ride on a ferry boat."¹⁴

The bridge, then, would be a time-saving device. And time, of course, is money. Two ideas adumbrated in this editorial are

¹⁴September 30, 1876. Perhaps the writer had in mind Whitman's "far-off" description of the towers in Specimen Days: ". . .the mast-hemm'd shores - the grand obelisk-like towers of the bridge, one on either side, in haze, yet plainly defin'd, giant brothers twain, throwing free graceful interlinking loops high across the tumbled tumultuous current below. . ." Complete Prose Works (Boston, 1901), p. 109.

made explicit by other periodical writers. One, the savings in time will result in a greater amount of business transacted, and two, bringing Brooklyn fifteen minutes closer to New York (for time is also space!) would dramatically increase real estate values in Long Island.¹⁵ An editorial in The Railroad Gazette a week after the bridge was opened put the entire matter of its value quite eloquently.¹⁶ What, asks the writer, is the nature of the work which the bridge will perform? He points out, first of all, that this is indeed "an enormously expensive structure to provide for passages which individually are of infinitesimal value." Notice, he says, that unlike a railroad bridge like the Eads Bridge in St. Louis, which unites thousands of miles of railroad, this span is a mere mile of highway for mere people to cross from one city to another, in fact, from one part of one city to one part of another. Certainly, then, it can not be the individual value of each crossing which "caused the erection of this costly work."

In effect, this writer is asking, how much is each crossing worth? This is an overpowering question, which could indeed dampen the reader's enthusiasm for the new bridge. The writer's

¹⁵See Engineering News, January 13, 1883.

¹⁶Railroad Gazette, Vol. 15 (June 1, 1883), p. 348.



intention, however, is not to be sophistical, but to dig below appearances and get to the real value, the potential which lurks in the sleek lines of the bridge. "On its face," he admits, "it would appear that the expense could not possibly be justified by the service performed." But if we look at the bridge in another way, its greatness will become evident. The bridge, he points out, is a way to increase radically the traffic (and business) between New York and Brooklyn - the increase measured in huge quantities rather than in single passages. But, the bridge can serve this end if, and only if, rapid transit cars can run through one city to another without a change at the bridge terminals. "Only in this way can a considerable saving of time be effected by the bridge."

Running trains across the bridge along with the cable-cars that would move from one terminal to another, would bring Brooklyn much closer to New York. At this point in his argument, the writer assumes a slightly imperialistic attitude toward Brooklyn, speaking of it almost as a territory to be exploited, and at the same time, to be up-lifted by the exploiters.

Brooklyn would truly be made part of New York, and the bridge would be of enormous advantage to it. Its beautiful sites for dwellings, now accessible only by a wearisome journey of an hour and a half, would be brought within half or 3/4 of an hour of Union Square, and a very large part of the objections to living in



Brooklyn, which have caused rents there to be half as great as in equally handsome parts, would be obviated.

Brooklyn, after all, is still a rather dependent area, in spite of its vast population.

Its people buy their goods and find their entertainment very largely in New York, as they do their business there. The obstacle which does not prevent the man's going to and from business in New York does prevent him and his family from attending theatres, concerts, public meetings and visiting in New York in the evening.

Culture, however, is not its own reward; it had an interesting by-product which a practical man could not ignore. The wealthy live in the city, the writer continues, for the sake of the privileges which only a center of civilization can offer. And, "the particular centre in this country is above Union Square, in New York." Any place within three-quarters of an hour from this center can enjoy its virtues, and at the same time, earn some virtues for landlords. Indeed, the writer assures us, "the whole difference is manifest in rents."

A house near Prospect Park in Brooklyn, a location unexcelled for beauty of situation, orderliness and cleanliness, will not bring more than half the rent commanded by a similar house in a handsome and not especially fashionable location in New York. Bring it within half an hour of Madison Square and the values will certainly be much more nearly equal. The building lots in Brooklyn, now 30 minutes or more from Fulton Ferry, would probably double in price - much more, very likely - should rapid transit between the two cities be provided.



And then, in a truly remarkable sentence which runs the full gamut of values imaginable by The Railroad Gazette, the writer concludes:

It is so certain that only a small part of the advantage of the bridge can be attained if there must be a transfer at each end of it, and the owners of real estate have so many millions and tons of millions to gain by the running of through cars, that we confidently expect that it will be done some time, that then first will really great usefulness result from this magnificent structure, which is one of the great monuments of the New World.

Perhaps this discussion of the value of the bridge was in fact a pitch for the rapid transit interests, who were already clamoring for privileges on the bridge. The writer's assumptions about the public good are typical of the period: time-saving, business, land-values, and genteel "up-town" culture emerge as the confused pastiche of his polis. Here indeed is a tangible "good" of the bridge which cannot be gainsaid; it is an agent of progress, civilizing the village of Brooklyn into the amenities of high culture and high rents.

II

If one is disposed to look at life through the conventions of drama, then the story of Brooklyn Bridge makes a neat comedy. It is staged in a world out of joint, and, depending on the dramatist, there are good men vying with bad men to restore the wholeness of community life. Throughout the action, virtue seems indeed to be a whore; even the least interested of the actors, the crippled chief engineer, appears tainted. The situation seems hopeless;

nowhere in sight is a hero powerful enough to be beyond suspicion of venality, nor a code of civic honor which might in the end serve as a court of appeal. And then, when things look their worst, suddenly the sky clears, the symbolic leaders appear and assume their noble offices, and virtue, cleansed and regenerate, is restored. Every comedy has its last act, and Brooklyn Bridge its Opening Ceremonies.

To be sure, it is not far from the mark to think of the Ceremonies as a public drama. Its pagentry is contrived; its tone is both festive and solemn. It is a serious civic occasion, uniting the people to their leaders in a rededication to the community principles of honesty, virtue, and accomplishment. The symbolic leader of the land, the President of the United States, sits on the platform and listens as other leaders from the spheres of government, business and religion weave a spell of magic rhetoric to rid the city of the evil visitations. The Great Bridge has survived its enemies, the breach is spanned, and the American world set right again.

And yet, in spite of the appearance of a traditional civic ceremony, similar to the rites of ancient and medieval cities, this occasion rests upon rather uneasy grounds. True, the occasion called for much fanfare; business was shut down, streets were bedecked with banners and bunting, fireworks and parades lasted late into the night. But what was the city celebrating? This was not an

annual feastday, nor a day of traditional exercises, such as the fraternal members of medieval cities enjoyed. It was the celebration of a unique, and in some sense, problematical event in the life of the city. The city was celebrating its growth. The event would, everyone knew, change the character of the city in some crucial way - though exactly how, no one could say for sure. It is extravagant to call the Opening Ceremonies a civic ritual; it was, so to speak, a non-repeatable event. And yet, in the absence of long-standing traditions, this occasion of an "opening" of some new facility was itself a tradition of sorts. Two similar occasions were brought to mind and referred to by the speakers, the opening of the Erie Canal in 1825, and of the Croton Aqueduct in 1842. Both of these events brought out thousands of people in parades and ceremonies. They were remembered as milestones in the city's history. Furthermore, along with Brooklyn Bridge, all three events were technological achievements which widened the scope of the city; instead of reinforcing a sense of urban autonomy and exclusiveness, each of these events "united" the city with a wider area surrounding it. Each in its own way increased the dependency of New York upon its geographical region, and so, had extra-municipal overtones. Not the mayor, but the state Governor and the President of the Nation were chief guests of honor.

The Brooklyn Bridge celebration surpassed the earlier ones in size and grandeur. The significant difference, however, was not simply in numbers. In 1825 and 1842 the citizens of New York celebrated the events through their many civic and craft organizations. In 1825 especially, the firemen, the carpenters, the millwrights, the merchants, the militia, the cabinetmakers, and so on, all subscribed to the gala celebration, built floats for the parade, and marched as groups. Civic identity was expressed through the participating voluntary organizations. In 1883, on the other hand, the only visible institutions were the militia and government; the only official parade was an escort for President Arthur from his hotel to the bridge. Merchants, of course, filled their windows and store fronts with banners and replicas of the bridge. A minister and a millionaire were among the featured speakers. The fire department decorated the river with fire boats, and an army band supplied the music. The police department did its share by watching for pick-pockets. The two leading symbols of the day, sold in large quantities by hawkers, were the American flag and small replicas of the bridge. Whether it was a national or a civic occasion, in short, was not perfectly clear.

The citizens, in other words, attended the affair simply as "the people." Undifferentiated into craft or civic groups, they were



the "audience." At the same time, the common theme among the speakers was that the "people" themselves were the featured guests of the afternoon. The main "action" of the pageant was the presentation on behalf of the trustees, and the mayors of New York and Brooklyn made the acceptance on behalf of "the people." The entire day was called "The People's Day."

Aside from the action of presenting the bridge to the cities, the Opening Ceremonies had another function. They served to clarify the meaning of the bridge. The implicit task of the speakers was to accept the bridge into the historical and moral experience of the cities, to establish its place in the mind. Much of what was said, of course, has no more apparent significance than the familiar 4th of July orations. It was a public assembly, and the speakers rolled out their full regalia of public rhetoric. For this reason, the speeches might be dismissed as highly conventional and therefore insincere. Sincerity, however, is not a necessary qualification for cultural significance; surely the conventions of language themselves suggest predispositions among Americans to react in certain ways at certain times. And on this occasion, when the people and their leaders stood together confronting something entirely new in their common experience - the world's largest suspension bridge, equipped to carry mechanically-drawn cable-cars as well as casual strollers - the language of their response reveals a set of familiar

ideas. On this day, in brief, Brooklyn Bridge was assigned its place within the popular conception of American life, and thus it became a real thing.

For example, surprisingly little was said about the bridge's importance as a bridge, as a solution to the large problems of urban transportation. Instead, the speakers took it primarily as an "achievement," an example of the American ability "to get things done." Three abstractions appeared over and over again during the speeches. These were the presiding divinities of Commerce, Science, and Courage. Commerce made "irresistable demands;" Science gave the means to overcome "the natural barriers to the union, growth and greatness of this great commercial centre;" and Courage added the moral fibre to keep Science at the task. "Science said, 'It is possible,' and Courage said, 'It shall be.'"¹⁷ The bridge was a uniquely American version of man's continuing victory over nature, "a trophy of triumph over an obstacle of Nature" (p. 24). The bridge embodied the virtues of an entire civilization, one which had begun its career on a virgin continent, and had raised

¹⁷Opening Ceremonies of the New York and Brooklyn Bridge (Brooklyn, 1883). All page references in the text are to this edition.

itself steadily to this eminence. "Courage, enterprise, skill, faith, endurance - these are the qualities which have made the Great Bridge, and these are the qualities which will make our city a great and our people great" (p. 8).

The image of the bridge as a "trophy" won against the odds of nature, was derived from the optimistic creed which prevailed in this period.¹⁸ It was based on a faith in universal moral values and in inevitable progress, with America as the vanguard of the race. Manifold rhetorical possibilities are suggested by this image, and the two leading speakers of the day exploited them eloquently. Abram S. Hewitt made the more deliberate attempt to place the bridge within the setting of American life, as the creed of progress defined that life, while the Reverend Richard S. Storrs of Brooklyn supplied a rich texture of metaphor for the occasion. I will consider the speeches of these two men, Hewitt and Storrs, in turn.

Abram S. Hewitt's connection with Brooklyn Bridge was only one of his many notable connections with public life in the city and the nation. He was a knight of service, a "good man," whose motives were universally recognized as selfless and pure. He was

¹⁸For an analysis of this creed, see Henry F. May, The End of American Innocence (New York, 1959), Part I, pp. 3-121.



a Trustee who could be trusted. Member of an old New York family, son of a cabinetmaker, and himself the nation's leading ironmaster, personal associate of Peter Cooper, Hewitt was the only New Yorker on the platform who could be considered a genuine burgher in the old sense.¹⁹ He represented a passing order, not only of social class, but social responsibility as well. Not only a philanthropist (he helped found Cooper Union), he was also an active scholar and lecturer on political economy; he served in Congress and on government commissions.

To get the full significance of his role in the Opening Ceremonies, it is profitable to get some picture of Hewitt's role in post-Civil War American life. Hewitt's main theme in the post-Civil War period was, the obligations of wealth toward poverty, the responsibility of wealth toward the social disruptions caused by wealth. Troubled by the same problems as Henry George, he offered

¹⁹In their Trenton Plant, Hewitt and Peter Cooper pioneered in iron girders and beams, introduced the open-hearth furnace to America, produced all the Union gun-barrells during the Civil War, and, in the 1870's, produced the first steel of commercial value. Hewitt was also a leading corporation figure, serving at one time or another as president of the U. S. Smelting Company, New York and Greenwood Lake Railroad, as vice-president of New Jersey Steel and Iron Company, as a director of the Erie Railroad, Lehigh Coal and Navigation Company, and the Alabama Coal and Iron Company. See Allan Nevins, Abram S. Hewitt (New York, 1935).

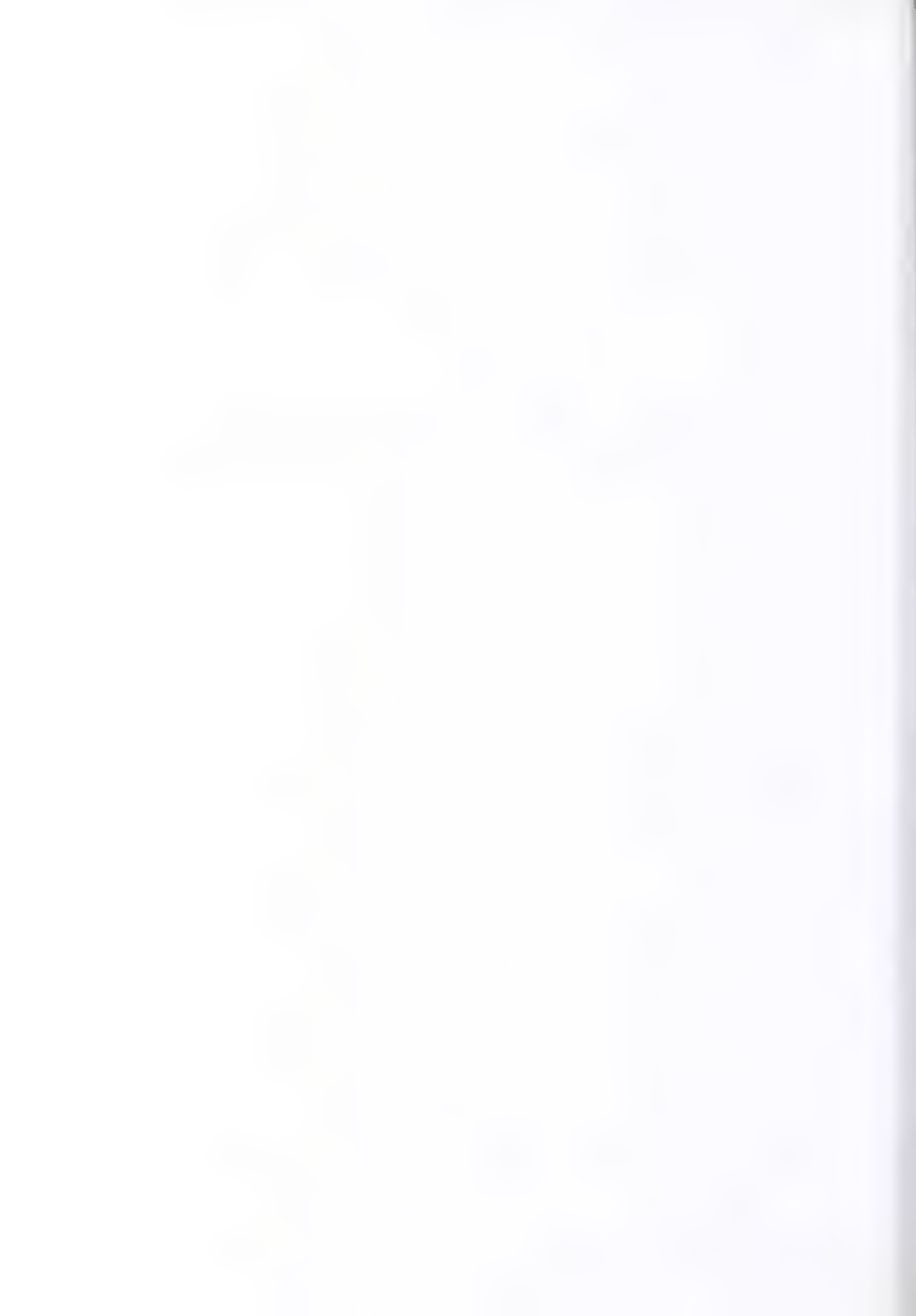
a more traditional and conservative answer.²⁰ Hewitt's approach to the problem of labor is typified by this passage from his report as United States Commissioner to the Paris Exposition (1867), "The Production of Iron and Steel in its Economic and Social Relations":

It cannot be that the aim of society is only to produce riches. There must be moral limits within which the production of wealth is to be carried on, and these limits have been and are being so obviously transgressed that a spirit of discontent pervades the entire industrial world.²¹

In this report, the chief offenders are the British capitalists, whose domination of the world iron market, he pointed out, was founded on their violation of "fundamental laws of humanity. . . in the employment of women and children and the payment of a rate of wages to the common laborer inadequate for the proper support and culture of the family." This inhumane situation, he suggested, could be corrected by legislation without harming British supremacy. His optimism for British capital is based on the huge natural resources of Great Britain, the "wonderful deposits of coal and iron" which in their richness compare to "our virgin soil in the United States." That is to say, nature would provide for capitalist and

²⁰In a close contest for mayor of New York in 1886, Hewitt defeated Henry George. Theodore Roosevelt was the third candidate.

²¹Allan Nevins (ed.), Selected Writings of Abram S. Hewitt (New York, 1937), p. 76.



worker alike. In the same report, Hewitt wrote that he hoped that America, which possessed "in addition to a fruitful soil the largest and best supplies of the fundamental elements upon which industry, progress, and civilization are based," would become an example of "how wealth may be created without the degradation of any class which labors for its production."²²

In America, Hewitt frequently called upon his fellow capitalists to accept certain moral limits - if only from the point of view of self-preservation. The discontent generated by economic distress could, he felt, invite anarchy and communism to America. He wanted, as he put it in 1878 to a church group in Cincinnati, to preserve individualism. This could be done only if the obvious inequities of distribution of wealth were corrected. Once the worker gets his fair share, then, he felt, the cardinal problem of modern industrial life would be solved. Such a solution would be an almost millennial promise of human happiness. For this reason, Hewitt welcomed the rise of trade unions. It was a good sign that labor was finally forcing capital to meet its demands.

Labor is thoroughly organized and marshalled on the one side, while capital is combined on the other; each

²²Ibid., pp. 82-85.

powerful to destroy the other if they engage in conflict, but equally powerful to assist each other if they work together in harmony.²³

This harmony, he proposed, was America's mission to create, and Brooklyn Bridge pointed the way.

Hewitt's connection with Brooklyn Bridge extended back to 1857. He was, in fact, the first businessman Roebling contacted about the feasibility of an East River bridge, and Hewitt had Roebling's proposal published.²⁴ Hewitt was not a member of the original company in 1867, but in 1872, he was appointed as a trustee to investigate company expenditures. His report was that the Tweed Ring had fled before they could seriously corrupt the project. Now, in his Opening Ceremonies speech, he was prepared to vindicate the bridge, and to explicate its meanings for Americans.

First and foremost, Hewitt said, Brooklyn Bridge was the world's most conspicuous emblem of progress. Every abstract formula of mathematics, every tool of man, is represented in the structure. He said, "It is not merely a creation; it is a growth. It stands before us today as the sum and epitome of human knowledge; as the very heir of the ages" (p. 47). As such, the bridge has

²³Ibid., p. 281.

²⁴See Steinman, p. 300.

several lessons about "the destiny of man and the outcome of human progress." One lesson is sociological. If we compare, Hewitt said, the wages of the workers upon the bridge with the wages of workers on projects of equal magnitude in the past, we can see most dramatically what progress has meant. The average daily wages were \$2.50, compared to what would have been two cents per day in the time of the Pyramids. This, indeed, is progress. "In other words, the effect of the discoveries of new methods, tools, and laws of force has been to raise the wages of labor more than an hundredfold in the interval which has elapsed since the Pyramids were built" (p. 52). Thus, the bridge proves conclusively, according to Hewitt's hopeful calculus, that, by "a higher and immutable law," science tends "to the steady and certain amelioration of the condition of society" (p. 53). It proves that, "notwithstanding the apparent growth of great fortunes. . .the distribution of the fruits of labor is approaching from age to age to more equitable conditions, and must, at last, reach the plane of absolute justice between man and man" (p. 53).

Hewitt's reasoning would appear to offer small consolation to the workers who actually, at one point in construction, struck for higher wages. But this was only one of the bridge's many lessons. The structure is a "symbol of social tendencies" in another way, too.

It shows that modern Americans build for peace, not for war; for free commerce between cities, not for celebration of the dead, as the Pyramids. Thus, the bridge contributes to "the solidarity of the human race" by breaking down barriers. And here in fact is a very pointed lesson for those in the nation who would obstruct free trade with the "artificial barriers" of high tariffs. If the obstructionists are right in their theories, Hewitt said, "then this bridge is a colossal blunder and the doctrine which bids us love our neighbors as ourselves is founded upon a misconception of the divine purpose" (p. 55).

Brooklyn Bridge, thus, is a fruit of Science, of free-flowing Commerce - and of Courage too. It is

a monument to the moral qualities of the human soul. It could never have been built by mere knowledge and scientific skill alone. It required in addition, the infinite patience and unwearied courage by which great results are achieved. . . The faith of the saint and the courage of the hero have been combined in the conception, the design, and the execution of this work (pp. 55-56).

Hewitt referred of course to the sudden death of John Roebling and the crippling injury of Washington Roebling, which dramatized the selfless dedication to the public welfare upon which Hewitt placed his entire faith in America. But the most affecting display of this saving virtue of faith and dedication came, to be sure, from a

woman. Mrs. Emily Warren Roebling, the wife of the crippled chief engineer, had served as a courier between her husband's sick quarters in Columbia Heights and his staff on the construction site. She had mastered all the details of the project, and had ably defended her husband against public attack. Hewitt rose to eloquence in her praise.

In ancient times when great works were constructed, a goddess was chosen, to whose tender care they were dedicated. Thus, the ruins of the Acropolis today recall the name of Pallas Athene to an admiring world. In the Middle Ages, the blessing of some saint was invoked to protect from the rude attack of barbarians and the destructive hand of time the building erected by man's devotion to the worship of God. So, with this bridge will ever be coupled the thought of one, through the subtle alembic of whose brain and by whose facile fingers communication was maintained between the directing power of its construction and the obedient agents of its execution. It is this an everlasting monument to the self-sacrificing devotion of women, and her capacity for that higher education from which she has been too long debarred (pp. 57-58).

Thus, through the association with Mrs. Roebling, the bridge represents the best - in fact, the best genteel - qualities of American life.

At the same time, it is significant that Hewitt evoked Brooklyn Bridge as a lesson for Americans, a lesson for lower tariffs, for higher education for women, for higher wages. That is to say, the qualities represented by the bridge are not the actual governing

qualities of America in 1883. Hewitt explicates the promise of the bridge; implicitly, however, a rather dark world of unpleasant realities surround the bridge.

For example, Hewitt felt compelled to spend a section of his speech on "such vindication as it is in my power to make" of the engineers and the trustees. He swore to the honesty of all concerned. The main point of his vindication, however, was to show that the history of the project had yet another lesson for Americans. That was, the "miracle" of the cities' themselves taking over control of a project which had begun "exclusively by private capital for the sake of profit" (p. 62). Hewitt's version of this event shows his confidence in the fundamental health of American life. He pointed out that a "band of thieves" captured the government of New York after the Civil War. For their own profit, the thieves built "a series of great and beneficial public works, not for the good they might do, but for the opportunity which they would afford to rob the public treasury" (p. 62). However, before long "the force of public indignation" drove the Ring into exile. With the "timely event" of their flight, "a new era commenced." The good men of the cities filled the offices of government, and their most symbolic act was to take over the bridge as a public work, thus salvaging the age's most important monument from the touch of

evil (actually, the transfer was made through the state government at Albany). Thenceforth, expenditure of funds was as honest and as economical as possible. Brooklyn Bridge thus stands as a "monument to the public spirit of the two cities" (p. 68).²⁵

In the final section of his speech, Hewitt showed that the bridge had quite profound symbolic meanings for the municipal government of the two cities. In a word, the bridge was a model of applied intelligence, a model which modern America, with its rapidly increasing problems, sorely needs. Hewitt pointed out that technology and high levels of organization create the modern tendency toward the concentration of people in dense cities. Viewed historically, this tendency is beneficent, leading to "the higher and more diversified life which can be secured by association and co-operation on a large scale" (p. 72). But political intelligence has not kept pace with the rise of giant cities; we see corruption and failures throughout our urban centers. New York and Brooklyn are

²⁵In 1894, Hewitt vigorously opposed the use of public funds to finance a subway system to be administered by private individuals, and proposed instead that the city both build and operate the system. He cited the example of Brooklyn Bridge. "The Brooklyn Bridge was originally a private corporation, with private stockholders. The City of New York never loaned its credit to the Brooklyn Bridge - not a penny - but what it did was to subscribe for a portion of the stock. The City of Brooklyn did the same thing. The administration of the work was in the hands of private stockholders, and it culminated in a scandal of the worst kind; and the result was that the City of New York and the City of Brooklyn were compelled to do - what they

not exceptions. For this reason, the two cities, Hewitt said, should consider carefully the proposed move toward consolidation. The bridge, he pointed out, is not so much a symbol of unity, but instead, a challenge "to a generous rivalry in perfecting each its own government" (p. 75). Furthermore, the bridge is tangible evidence that the problem can be solved. It shows "how a problem analagous to that which confronts us in regard to the city government has been met and solved in the domain of physical science" (p. 76).

The bridge, that is, represented "organized intelligence." Consider, Hewitt said, what lesson we can draw from the corrupt Ring. Knowing nothing at all about bridge construction, they "proceeded to organize the knowledge which existed as to the construction of bridges; and they held that organization thus created responsible for the results" (p. 76). The engineers had the responsibility for creating the bridge, and consider what that responsibility comprised. The bridge

looks like a motionless mass of masonry and metal; but as a matter of fact it is instinct with motion. There is not a particle of matter in it which is at rest even for the minutest portion of time. It is an aggregation of unstable elements, changing with every change in the temperature and every movement of the heavenly bodies.

ought to have done in the first place, or to have done nothing - they were compelled to buy out the private stockholders, and become the sole owners of the work." Quoted in Nevins, Abram S. Hewitt, p. 57.

The problem was, out of these unstable elements, to produce absolute stability. (p. 77)

The bridge is constantly changing, expanding and contracting several feet under extremes of temperature. The problem was, in brief, how to reconcile a large number of variables into one coherent, stable structure. The engineers solved the problem, not by repressing the motions of the separate elements, but by allowing free and cooperative play among all the elements.

This, then, is the most important lesson to America in this structure created by science and technology: "If our political system were guided by organized intelligence, it would not seek to repress the free play of human interests and emotions, of human hopes and fears, but would make provision for their development and exercise, in accordance with the higher law of liberty and morality" (pp. 78-79). Conflict, Hewitt said, is the law of the city, but intelligence, guided by Science, Commerce, and Courage, can transmute conflict into harmony. The bridge recommends, Hewitt announced, that each citizen become an active element in the structure of urban life. The overthrow of the Tweed Ring proves the existence of public virtue. That demonstration itself, Hewitt said, redeemed the twenty or thirty millions of dollars stolen of the Ring. The virtue is there, the intelligence is there, and national economic progress indicates that commercial health is also



there. All that remains is the confusion of political life. Once that is eliminated, "who can venture to predict the limits of our future wealth and glory?" (p. 82). If we heed the message of the bridge, the world will see a new phase in its history, the realization of ancient dreams.

Beyond all legends of oriental treasure, beyond all dreams of the Golden Age, will be the splendour, and majesty, and happiness of the free people dwelling upon this fair domain; when fulfilling the promise of the ages and the hopes of humanity, they shall have learned how to make equitable distribution among themselves of the fruits of their common labor (pp. 82-83).

Facing an imperfect world, Abram Hewitt implored the bridge to bring about the very world of moral intelligence which it celebrated. It was, in his eyes, a monument to a future perfection.

III

If Abram S. Hewitt, spokesman for an older order in American life, dealt with the hard realities of the day, the Reverend Richard S. Storrs, true to his office, dealt with the world of spirit. He spoke in a language rich with metaphor, as though he perceived evidence of divinity in the mechanical structure before him. It is not too extreme to say, in fact, that in Reverend Storrs' address, Brooklyn Bridge is delivered forth into the hands of poets as a myth.

Storrs began his oration with the tone of rejoicing. He rejoiced that

the 'silver streak' which has so long divided this city [Brooklyn] from the continent, is conquered, henceforth, by the silver band stretching above it, careless alike of wind and tide, of ice and fog, of current and calm (p. 21).

Then he offered proper praise to the principals, the engineers, the politicians, and "the real builders of the bridge," the people. When you contrast, he pointed out, the structure of St. Petersburg and of Paris, both constructed by the will of autocrats, then Brooklyn Bridge is clearly "a durable monument to Democracy itself" (p. 22).

But not only have these cities of ours been founded, built, and reconstructed by the people, but this charming and mighty avenue in the air, by which they are henceforth rebuilt into one, is to the people's honor and praise. It shows what multitudes, democratically organized, can do if they will (p. 22).

As a monument to democracy, the bridge is also a promise, and a prophecy. "One standing on it finds an outlook from it of larger circumference than that of these cities" (p. 24). The widened horizons proceed, first of all, from the fact that the bridge connects Brooklyn with the delights and enrichments of the metropolis (Storrs' fellow clergymen could be expected to raise eyebrows at this mention of New York's "delights"). Moreover, that metropolis itself was the "natural centre of radiation" of the continental railroad system; the bridge, then, connects Brooklyn with the heartlands of the continent.

The bridge is a "surer certainty and a greater rapidity;" "the horizon widens around us as we touch with more immediate contact the lines of travel which open hence to the edge of the continent" (p. 23).

As a technological achievement, the bridge will serve as an incentive to others; it will, the Reverend Storrs assured his audience, inaugurate a new age in America.

Indeed, it is not extravagant to say that the future of the country opens before us, as we see what skill and will can do to overleap obstacles, and make nature subservient to human designs (p. 24).

The spirit of optimism indeed reigns supreme in Storrs' oration. In this passage, we see that he has fused the traditional Christian creed with the American. He celebrates not divine but human will. And the chief cause for his celebration is the very material of which the bridge is made, steel, "the chiefest of modern instruments." Steel is "the kingliest instrument of peoples for subduing the earth" (p. 24). In America, the great supply of steel is based, he suggests, on the vast accumulation of gold. In America, this "new supremacy of man" over the ancient metal illustrates "the bolder temper which is natural here, the readiness to attempt unparalleled works, the disdain of difficulties" (p. 25). Steel, in short, is America's spiritual medium.

I hardly think that we yet appreciate the significance of this change which has passed upon iron. It is the industrial victory of the century, not to have heaped the extracted gold in higher piles, or to have crowded the bursting vaults with accumulated silver, but to have conferred by the sovereign touch of scientific invention, flexibility, grace, variety of use, an almost ethereal and spiritual virtue, on the stubbornest of common metals (p. 25).

Standing on the bridge, one can thus contemplate a future of unlimited human victories over the baser materials of nature.

Also, it is significant, Storrs pointed out, that steel in this case is used for peace, not war. A bridge unites, and thus it is the very "type of all that immeasurable communicating system which is more completed every year to interlink cities, to confederate States, to make one country of our distributed imperial domain, and to weave its history into a vast, harmonious contexture, as messengers fly instantaneously across it, and the rapid trains rush back and forth, like shuttles upon a mighty loom" (p. 26). The bridge is a product and a servant of peace. Its very appearance makes it the "express palpable emblem" of peace. Contrast it with the famous warship, the Monitor.

No contrast could be greater among the works of human genius than between the compact and rigid solidity into which the iron had there been forged and wedged and rammed, and these waving and graceful curves, swinging downward and up, almost like blossoming festooned vines along the perfumed Italian lanes; this alluring roadway, resting on towers which rise like those of ancient cathedrals (p. 27).

It is a Bridge of Peace, America's Arch of Triumph, dedicated to "the tranquil public order which it celebrates and prefigures." It is New York's Brandenburg Gate, "bearing on its summit no car of military victory." It stands within, not outside this "united city by the sea, in which all civilized nations of mankind have already their many representatives, and to which the world shall pay an increasing annual tribute" (p. 29). The bridge itself, built by a German, standing next to the figure of Liberty in the harbor built by a Frenchman, "represents that fellowship of the Nations which is more and more prominently a fact of our times" (p. 30). This double crown in the harbor, is an auspicious omen: "the alliance of nations, the peace of the world, will seem to find illustrious prediction in such superb and novel regalia" (p. 30).

Considering all this, what more fitting image for such a magical bridge which promises such harmony and peace everlasting, than an eternal harp!

This structure will stand, we fondly trust, for generations to come, even for centuries, while metal and granite retain their coherence; not only emitting, when the wind surges through its network that aerial music of which it is the mighty harp, but representing to every eye the manifold bonds of interest and affection, of sympathy and purpose, of common political faith and hope, over and from whose mightier chords shall rise the living and unmatched harmonies of continental gladness and praise (pp. 27-30).

Such is the expectation which Reverend Storrs, throwing his rhetoric into the winds of crisis which had been unsettling the city and the country for a generation, assigned to Brooklyn Bridge. He spoke of "mechanical invention ever advancing," of "beneficent peace," of "expansion and opulence." And for his final rhapsody, the orator lengthened his periods and hitched up his rhythms for a solemn benediction of the cities to their destiny.

Surely we should not go from this hour, which marks a new era in the history of these cities, and which points to their future indefinite expansion, without the purpose in each of us, that, so far forth as in us lies, with their increase in numbers, wealth, and equipment, shall also proceed, with equal step, their progress in whatever is noblest and best in private and in public life; that all which sets humanity forward shall come in them linked together, and hereafter they must be, and seeing "the purple deepening in their robes of power," they may be always increasingly conscious of fulfilled obligation to the Nation and to God; may take the land at whose magnificent gateway they stand, their constant debtor; and may contribute their mighty part toward that ultimate perfect Human Society for which the seer could find no image so meet or so majestic as that of a City, coming down from above. . . (p. 31).

From Brooklyn Bridge to "that ultimate perfect Human Society" may seem a leap even Roebling had not dreamt of. But the vision did not belong to Storrs alone. Whitman, remember, had seen the works of engineers as the promise of the race, and Lowell had said that the telegraph "etherealized" and "ennobled" patriotism. The Reverend Storrs' rhetoric was lavish indeed, and more decorative than substantial; furthermore, considering the open knowledge

of corruption, poverty and violence in the cities he praised, his language is quite wishful. Yet, Storrs' expression showed a characteristic response to the rise of technological objects. He tried to spiritualize the bridge by giving it a role to play within a cosmic drama. His figures, then, serve us well as a transition to the bridge in the twentieth century, and in particular, to Hart Crane's more serious and less facile effort to do the same thing.

CHAPTER VII

IN THE SHADOW OF A MYTH

Among democratic nations the sources of poetry are grand, but not abundant. They are soon exhausted; and poets, not finding the elements of the ideal in what is real and true, abandon them entirely and create monsters. I do not fear that the poetry of democratic nations will prove insipid or that it will fly too near the ground; I rather apprehend that it will be forever losing itself in the clouds and that it will range at last to purely imaginary regions. I fear that the productions of democratic poets may often be surcharged with immense and incoherent imagery, with exaggerated descriptions and strange creations; and that the fantastic beings of their brain may sometimes make us regret the world of reality.

Alexis de Tocqueville, Democracy in America

In the care of poets and painters, Brooklyn Bridge has thrived as a monument. Artists have been the chief servants of the bridge after the Opening Ceremonies. They have recreated its form on canvas and sung its name in verse. Many of them, most notably Joseph Stella and Hart Crane, have consciously sought the symbolic meanings of the bridge. For this reason, Brooklyn Bridge gives us a chance to examine the ideas and feelings of artists side by side with public figures like Abram Hewitt and Richard Storrs.

From the Opening Ceremonies to the publication of Hart

Crane's The Bridge (1930), responses to the bridge fall into a discernible pattern. The pattern is not surprising. In 1883, the response was confident. All seemed well with America. In 1930, the case was different. Crane, perhaps the most optimistic writer in the period, found it extremely difficult to sustain his optimism. His treatment of the bridge is the final chapter in the career of Brooklyn Bridge as an active symbol in American life. Before Crane, Henry James and Joseph Stella provide the most important interpretations of the bridge in the twentieth century.

I

"New York Revisited"

In the city, time becomes visible: buildings and monuments and public ways, more open than the written record, more subject to the gaze of many men than the scattered artifacts of the countryside, leave an imprint upon the minds even of the ignorant or the indifferent.

Lewis Mumford, The Culture of Cities

A voice from out the Future cries,
 'On! on!' - but o'er the Past
 (Dim gulf) my spirit hovering lies
 Mute, motionless, aghast!

E. A. Poe, "To One in Paradise"

The New York which Henry James describes in The American

Scene¹ has an unmistakable twentieth century character. It has more in common with the technological wilderness of lights and sheer drops of Dos Passos than with the picturesque, though discomfiting, view of crowds, elevated trains, and slums of Howells, or with the mysterious glittering pleasures and desolate poverty of Dreiser. It is not an exaggeration to say that James was the first of our writers to see the city as a force that makes a real and terrible difference for our literature. For James, the city is not merely a new environment, a new "reality" for realists to "capture." The problem the city poses for the artist, James understood, lies deeper than the physical setting; it lies in the fact that the American city, by its nature, is an enemy of consciousness. This is so because the city is endlessly changing, endlessly destroying, or as it liked to call it, "renewing" itself. It resists time, it denies history, and it lives in a constant "renewal" of the present moment. New York, in short, is not for James merely another arena in which the age-old dramas of love and greed take place; it is threat to the integrity of mind.

James' perception of the nature of New York was earned not only by his famous expatriation, but, even more importantly, by his memory of an earlier New York. The expatriation and his

¹The American Scene (New York, 1907). All page references are to this edition.

acquired European sense of the "forms" of civilization gave him fresh eyes; his memory gave him an interested curiosity along with a standard of measurement. In the Preface to The American Scene, he writes, "if I had had time to become almost as 'fresh' as an inquiring stranger, I had not on the other hand had enough to cease to be, or at least to feel, as acute as an initiated native" (p. v). From this dual point of view, James discovered a world more alien than he expected. He found himself a displaced person in America. The very first impressions he received as he disembarks at Hoboken were of "a past recalled from very far back." He writes, "One's extremest youth had been full of New York, and one was absurdly finding it again, meeting it at every turn, in sights, sounds, smells, even in the chaos of confusion and change" (p. 1).

The changes had indeed been great, and the "chaos of confusion" everywhere. He finds it in the arrogant skyscrapers, those "giants of the mere market" which have "crushed" the old familiar monuments of his youth, "quite as violent children stamp on snails and caterpillars" (pp. 78-79); he finds it on Ellis Island, where the sight of the immigrant crowds "shakes him. . . to the depths of his being" (pp. 82-84), and leaves a "new chill in his heart," the chill of dispossession; he finds it in the "horrible voice of the air," which whispers that all old buildings, old associations

and even current ones - are doomed by the "I build you up to tear you down" spirit of "removal" in New York (p. 91). The modern city, he finds, has even eliminated the chance for escape from the pressures of the present. Visiting Lower Fifth Avenue on an "excursion of memory," he has the momentary illusion that here at least, nothing had changed. But the illusion quickly leaves him as he faces the site of his birthplace, and finds it has been replaced by another building. "For a high, square, impersonal structure, proclaiming its lack of interest with a crudity all its own, so blocks, at the right moment for its success, the view of the past, that the effect for me, in Washington Place, was of having been amputated of half my history" (p. 88). In brief, New York gives James "a hateful sense of personal antiquity" (p. 77).

To be sure, James' acute sense of displacement is typical of his class, the cultured literary and political class of the mid-nineteenth century, in this watershed period of national life. He speaks in tones of loss that the Adamses, the Nortons, and the Woodbridges would understand. Also, James' criticism of the city was by and large characteristic of the period. Both the rural and the genteel groups felt uneasy and threatened by the vast changes in the urban scenery, especially the unfamiliar faces and accents of Eastern European immigrants. To this extent, James

is representative, but this extent does not go very far with James. The representative part of James' response to the city is largely besides the point. What is much more important is how James responds, as it were, to his own responses. He is detached from his "Americanness" in a unique and original way - a way we recognize as Jamesian. This detachment prevents his response from dissolving into lament and nostalgia. A sense of alienation for him is not a cause to be flaunted; it is instead another fact to be considered, another "impression" to be dealt with. James does not succumb to the alternating currents of American culture of happy optimism and bleak despair. The American Scene is as powerful and thrilling a document as it is because it dramatizes the effort of a mind to remain whole in the face of many temptations to escape the rigors of consciousness.

In this work as in his novels, consciousness is everything. James casts himself as the chief character, the "central intelligence," and his role is not simply as the native returned, but, as a "restless analyst." He has returned not merely for the experience, but to make something of the experience. "I would take my stand on my gathered impressions, since it was all for them, for them only, that I returned," he writes in the Preface (p. v). The overwhelming problem of the book is the book itself; that is to say,

how might a book, an ordered narrative of so unsettling an experience, come into being at all? Within the narrative, this question is always uppermost.

The subject was everywhere - that was the beauty, that the advantage: it was thrilling, really, to find one's self in presence of a theme to which everything directly contributed, leaving no touch of experience irrelevant. That, at any rate, so far as feeling it went; treating it, evidently, was going to be a matter of prodigious difficulty and selection (p. 3).

Running throughout the narrative, like a voice of resistance, is the stubborn question: what are we to make of this new, brash civilization? What are the possibilities for culture, for art, for consciousness, in the New America?

James has no final answer to this question, except that the continual asking of the question, at all times and in all circumstances, is answer enough. Art and consciousness depend on the ruthless putting of the question. I say "ruthless" because the civilization James perceives is one which takes no account of consciousness itself. The new urban order has outstripped the mind. Its growth has been fabulous and orderless, and its chief symbol is the skyscraper: "the 'American beauty,' the rose of interminable stem, becomes the token of the cluster at large" (p. 74). It is in the presence of the skyscraper, particularly as it "overhangs" Trinity Church like "a mountain wall that drops the

Alpine avalanch, from time to time, upon the village," that the question of consciousness occurs most poignantly (p. 80). When James learned, to his "stupefaction," that the skyscraper in question was created by the church-wardens themselves, he realized the "pitiless ferocity" of the case. The church, as one of the last refuges of the humane, has surrendered its ability to resist, or at least to humanize, the "vast money-making" structures surrounding it. The sight of this surrender leads James to say that "New York was not going (as it turns such remarks) to produce both the maximum of 'business spectacle' and the maximum of ironic reflection of it" (p. 80). Then, he quite remarkably points out that the visual appeal of the skyscraper itself compounds the confusion and undercuts the chance to think clearly about its meaning. He pointed out that the skyscraper "quite horribly, quite romantically justified itself, looming through the weather with an insolent cliff-like sublimity" (p. 81). This insight looks forward to the celebration of the skyscraper in the 1920's; it also casts a raised eyebrow at the idealized, soft-focus photographs Stieglitz and Steichen were making of the Flat-Iron building in the same period.

James writes that in the face of the skyscraper, he felt a "confusion carried to chaos for any intelligence, any perception;

a welter of objects and sounds in which relief, detachment, dignity, meaning, perished utterly and lost all rights" (p. 81). How to attain detachment and meaning is a problem, as we shall see, that Hart Crane faced in the middle 1920's. Crane thought that his poem, The Bridge, would serve that purpose; it would be, he felt, an "epic of modern consciousness." James, however, was pessimistic about the chances of an epic treatment of the city.

The reflecting surfaces, of the ironic, of the epic order, suspended in the New York atmosphere, here have yet to show symptoms of shining out, and the monstrous phenomena themselves, meanwhile, strike me as having, with their immense momentum, got the start, got ahead of, in proper parlance, any possibility of poetic, of dramatic capture (p. 80).

Crane, of course, thought he had what James did not, a symbol powerful and rich enough to subdue the skyscrapers. In light of the redemptive powers Crane attributes to Brooklyn Bridge ("Terrific threshold of the prophet's pledge"), it is intriguing to discover that James, too, confronted the bridge, and saw it in quite a different light. He saw it as an ally of the skyscraper. In this sense, James had quite an original relation with the structure. Brooklyn Bridge had many admirers in this period. It was frequently painted, by the Impressionists Hassam and Twachtman especially, and Joseph Pennell, looming in the mist

of the harbor.² It was widely photographed, and its image was spread abroad the world as an emblem of the Empire City. In fact, Charles Scribner's Sons, used a line drawing of the towers of the bridge as a signature plate on the title page of the New York Edition (1907) of James' works. By failing to respond to the bridge with admiration, by failing, in fact, to distinguish Brooklyn Bridge from the other bridges in New York, James was certainly going against a minor grain in American life.

This failure is all the more interesting considering that, in the opening paragraphs of the chapter, "New York Revisited," James submits himself to the forceful impressions of the harbor. Like Whitman before him and Hart Crane after, James is thrilled by the "happily-excited and amused view of the great face of New York" (p. 70). Like them, he sees the free-floating sea gulls as appropriate symbols of the entire vista. He is on a railroad-barge, rounding the tip of the island, and moving up the East River, and he writes:

The extent, the ease, the energy, the quantity and number, all notes scattered about as if, in the whole business and in the splendid light, nature and science were joyously romping together, might have been taking on again, for their symbol, some collective

²See The Brooklyn Museum Catalogue, Brooklyn Bridge, 75th Anniversary Exhibition (Brooklyn, 1958).

presence of great circling and plunging, hovering and perching sea-birds, white-winged images of the spirit, of the restless freedom of the Bay (pp. 70-71).

James departs from Whitman and Crane, however, in that his sensations lead him to a characteristic question: what accounts for this bristling appeal of the harbor? The answer is complex, and we learn that the apparently innocent note of "nature and science. . . joyously romping together" is in fact an ominous note. The "largest suggestion" of the scene, James feels, is that of "things lately and currently done, done on a large imperson stage and on the basis of inordinate gain" (p. 71). But this does not explain the thrill and charm of the scene. Indeed, he points out, it is hard to say where the charm comes from; there are none of the picturesque items that give the charming effect to Naples, Sydney, San Francisco. Perhaps, he says, the appeal is not in the harbor, but in the observer, in the "intellectual extravagance of the given observer." Not the actual facts of the harbor, but its tone strikes James with its intensity. It is "that note of vehemence in the local life. . .for it is the appeal of a particular type of dauntless power" (p. 72).

The next paragraph is crucial. "The aspect the power wears then is indescribable," it begins. How does one describe the indescribable? Particularly if it attracts and appalls at the same time? What James searches for is an image equivalent to the

quality, as he puts it, of "a diffused, wasted clamor of detonations." He finds the image he wants in the "great intricate frenzied dance. . . performed on the huge watery floor" (p. 73), that is, in the tireless traffic passing over the East River bridges. The image is a violently technological one.

This appearance of the bold lacing-together, across the waters, of the scattered embers of the monstrous organism - lacing as by the ceaseless play of an enormous system of steam-shuttles or electric bobbins (I scarce know what to call them), commensurate in form with their infinite work - does perhaps more than anything else to give the pitch of the vision of energy (p. 73).

The bridges (and the following passage suggests that James was looking mainly at the webbed Brooklyn Bridge) express the "monstrous" aspect of the city. They serve the city, in forms commensurate with their function. But the marriage of form and function is no cause for delight. Hardly! The function frightens James, for he sees it as "merciless multiplication," the compounding of confusion by confusion. James' language strains in the following passage, and his exacerbated imagery foreshadows the images of mechanisms that appear in surrealist and expressionist painting and literature not many years later.

One has the sense that the monster grows and grows, flinging abroad its loose limbs even as some unmannered young giant at his "larks," and that the binding stitches must forever fly further and faster and draw harder; the future complexity of the web, all

under the sky and over the sea, becoming thus that of some colossal set of clockworks, some steel-souled machine-room of brandished arms and hammering fists and opening and closing jaws. The immeasurable bridges are but as the horizontal sheaths of pistons working at high pressure, day and night, and subject, one apprehends with inconsistent gloom, to certain, to fantastic, to merciless multiplication. In the light of this apprehension indeed the breezy brightness of the Bay puts on the semblance of the vast white page that awaits beyond any other perhaps the black overscoring of science (p. 73).

Brooklyn Bridge is clearly on the side of the devil in this passage; it is an agent of the city's violent invasion of nature, of the "vast white page" of the Bay.

The "black overscoring of science" erases the settled landmarks of New York by which James finds his location. In effect, technology erases James' very identity as a "native son." James characteristically uses landmarks to locate himself, and his fictional characters, in space and time. Objects and places serve James in his fiction through the associations they bear to his characters. A character's associations with a place humanizes that place. As with Isabel Archer and Gardencourt, each new encounter is a new experience based upon the old associations; it is a new process of humanization, and this contributes to the character's self-discovery. The modern city has deprived James himself, as the leading character of The American Scene, of this

chance to rediscover himself in a familiar landscape. An undercurrent of helplessness runs through this section of the book. James is like Rip Van Winkle, whose bearings in a new world depend upon his recognition of familiar sights, transformed though they may be. Castle Garden, the old City Hall, the cite of his birthplace - these have survived, in association at least, as the measures for James of his present relation to the place, and the times. Unlike Rip Van Winkle, however, James is entirely contemporary. He resists the pleasure of nostalgia or the peace of paralysis. The textual difficulty of The American Scene, in fact, comes from James' sometimes painful energy of mind to encompass and comprehend his experience. His sense of the past serves James, as it does in his novels, to define his sense of the present, and that is what counts most of all for James.

Quite obviously, Brooklyn Bridge does not serve James because he has no human relationship with it. In turn, it does serve Crane and many others precisely because of a personal relation. But this alone does not explain James's response to the bridge. His linking of the bridge and the skyscrapers together as agents of the "black overscoring of science" should remind us that Brooklyn Bridge, whatever else it may be, is also a road for heavy mechanized traffic. No matter how poets and painters see the bridge, it never

fails to be one of the "horizontal sheaths of pistons working at high pressure, day and night." If, as James says, the expression of the city in art requires that the artist resist the constant upheaval of the city, can Brooklyn Bridge, an agent of the city, help? Can the bridge both serve and resist the city?

The dilemma in this question becomes a major difficulty in Hart Crane's poem. James makes us alert to certain ambiguities in Brooklyn Bridge. How in fact does the bridge humanize the city? Certainly, for Roebling, the promenade was a chief agent of urban amenity, just as the rest of the roadway was a chief agent of commerce. Crane, Stella, and others, make a great deal of the promenade; a walk across the bridge is a change of pace, not to speak of a radical break from the frenzy of the city. As the twentieth century moved on, however, the bridge was used less and less as a promenade, and the point in 1916 when mechanized traffic finally surpassed foot traffic marks an important change in the relationship between Brooklyn Bridge and the city.³ Records and graphs make a prophet of James. Endless multiplication has

³See New York Department of Public Works, Chronological Narrative of Brooklyn (1933), p. 20. The figures show that, not counting passengers in trolley and elevated cars, 7,552 passed over in vehicles, 7,593 on foot in 1915, and 7,778 in vehicles and 5,684 on foot in 1916. Until this year, pedestrians far outnumbered vehicles (excluding trolleys and elevated trains). It is

indeed been a major result of the bridge. Furthermore, James uncannily anticipated the emotions of wonder which Hart Crane and Joseph Stella apparently felt toward the vast multiplication. James writes that in the face of all the "extent and reduplication, the multiplication of cognate items and the continuity of motion" (p. 119), he felt two sensations. The predominant one was fatigue: there is just too much "for the personal relation with it." The other sensation is a reflex of fatigue; it is the sensation of inscrutability. Impersonal wonder became a substitute for the personal relation.

He doesn't know, he can't say, before the facts, and he doesn't even want to know or say; the facts themselves loom, before the understanding, in too large a mass for a mere mouthful: it is as if the syllables were too numerous to make a legible word. The illegible word, accordingly, the great inscrutable answer to questions, hangs in the vast American sky, to his imagination, as something fantastic and abracadabrant; belonging to no known language, and it is under this convenient ensign that he travels and considers and contemplates, and, to the best of his ability, enjoys (p. 118).

James implies that the over-abundant and undigested facts of American life justify what Tocqueville also described as a dangerous possibility in American literature, "the inward, the philosophic, escape into the immensity" (p. 119). James of course does not

interesting that in 1922, 1923, 1924, while the bridge was under repairs, pedestrian traffic again, though only temporarily, surpassed vehicular traffic. These were the years Hart Crane began his work on The Bridge.

stay in the immensities - his eye for details and ironies keeps him quite close to the facts - but the tendency he finds in himself to surrender to the metaphysical view introduces us to Joseph Stella and Hart Crane. For them, the "fantastic and abracadabrant" become the new language by which Brooklyn Bridge might be legible.

II

Joseph Stella's "Brooklyn Bridge"

For many people, Brooklyn Bridge is merely an image on paper, nothing more. The bridge is among the most widely reproduced images in America, along with artifacts like the Washington Monument and the Capital building. From the very beginning of its career, the New York press followed its construction very closely; not the statistics and stories, however, but the illustrations gave New Yorkers their vivid sense of the new structure. We can, in fact, trace every phase of construction - the sinking of the caissons, the erection of the towers, the spinning of the cables - in the engravings of the times. These illustrations, of course, were a form of pictorial journalism before the development of the photo-engraving process. Since the opening of the bridge, however, professional and amateur painters and photographers have taken

over where the journalists left off. I doubt that there is any other single object that has been painted as often by serious artists in America as Brooklyn Bridge. Some artists like Marin and Stella, used it as a subject over and over again. Also, the bridge has been painted in every style in fashion since 1883, from the "dark impressionism" of Twachtman to the abstract expressionism of Afre.⁴

The reason for the popularity of Brooklyn Bridge among painters is not difficult to discover. It is, first of all, an impressive object, particularly in its site overlooking the bay. Second of all, it lends itself well to the various styles in which it has been portrayed: the towers, seen especially in mist and fog, make an excellent impressionist subject, while the naked geometry of the cables and supporting stays make it suitable for cubism and futurism. Also, I suspect that once established as a popular object for representational painting, it remained so, somewhat as a convention. It was a native theme, it belonged to the city as a landmark, and in many ways, it was simply "the thing to do" to paint Brooklyn Bridge. Furthermore, in the early years of modernism in America, after

⁴For a list, though not complete, of paintings, watercolors, drawings, prints, engravings and photographs of Brooklyn Bridge, see Brooklyn Bridge, 75th Anniversary Exhibition.

the Armory Show of 1913, artists deliberately sought out native themes, especially those associated with the new age of machinery, and thus Brooklyn Bridge was doubly popular.

It would make an interesting chapter in the history of painting in America to trace the development and changes in the image of the bridge since the 1890's. But that is not my purpose. I am concerned with interpretations of the bridge, with meanings attributed to it, and from this point of view, not every treatment in painting, even though of high artistic value, is important. In fact, there is no necessary correlation between artistic value and "significance" in regard to the theme of this study.

Of course, from a broad point of view, every visual recreation of the shape of the bridge is an interpretation. Unless the artist is merely an illustrator, he will alter or distort the appearance of the object, and the distortions will measure the degree and kind of interpretation. But then again, a painterly interpretation is frequently of the sort that cannot be translated into words. It may be the case, as in some cubistic paintings based on Brooklyn Bridge, that the painterly interpretation reveals the artist's conception of space rather than of the bridge; to conceive the bridge as a geometric mass with certain spatial relations is a special point of view toward the object, a point of view decidedly modern.

What I am looking for, however, are interpretations of the bridge itself, as a cultural object rather than as a mere physical object. I am looking for, in short, interpretations which can be translated into the language of criticism I have been using so far in this study.

The rendition of the bridge in modern art begins with John Marin. The Woolworth Building and Brooklyn Bridge were Marin's favorite New York subjects. He painted them both in the same period, about 1912. Like the skyscraper, the bridge was to him an abstract expression of energy. His visions of the entire city in this period were nervous and agitated. He felt deeply moved, in a kinetic way, by the forces of the city. In 1913, he wrote, "It is this 'moving of me' that I try to express." He continued:

I see great forces at work; great movements; the large buildings and the small buildings; the warring of the great and the small; influences of one mass on another greater or smaller mass. Feelings are aroused which give me the desire to express the reaction.⁵

Like James, Marin submitted himself to these sensations. But unlike James, he tried to record their immediate impact, rather than

⁵Herbert J. Seligman, ed., Letters of John Marin (New York, 1931), n. p. See also, Milton W. Brown, American Painting from the Armory Show to the Depression (Princeton, 1955), p. 134.

a calm appraisal of their meaning. In doing so, Marin emphasizes his personal response rather than the physical features of the object before him. His Brooklyn Bridge is a highly distorted image. The image itself has, in fact, little to do with the bridge; it does not respect the integrity of the structure.

Marin's style in his urban paintings and etchings was strongly influenced by Fauvism, a style which stressed the emotional experience of the painter and gave him freedom to distort and to disintegrate his subject. Stella's paintings of the bridge were influenced instead by Futurism, which was a more calculated response to modern technology than Fauvism. For the Futurists, the machine was a symbol, not merely the occasion for a personal response. The movement, beginning in Italy in 1909-1910, tried to achieve a style in which the mechanisms of modern life would supply the form and structure to the canvas. In this sense, Futurism was close to Cubism; both employed starkly geometric forms. Cubism, however, was rational and precise; it was also indifferent to the subject of its analysis. Futurism, on the other hand, was infused with emotion. As John I. H. Baur points out, the Italian Futurists "exalted the speed and impersonal power of the airplane and the automobile." They "attempted to capture the



motion and force of these rather than the precision and relation of their parts."⁶ Futurism, then, was a movement based on the celebration of technological objects. Instead of dealing with modern life pictorially, as did the realists of the so-called Ash Can group, they dealt with it symbolically, devising forms, such as the "force line," to convey the rhythm and total sensuous impact of technology.

Before Stella's painting of 1917-1918, the French painter, Albert Gleizes, produced two Brooklyn Bridge canvasses with Futuristic overtones. The first, done in New York in 1915, is cubistic and non-representational (Figure 5). The canvas consists of rectangular areas of color, dissected by arcs, and surrounded by triangles. It gives the effect of spatial complexity and depth, receding into the center of the canvas. There are no recognizable machine forms, nor any structural details of the bridge. Instead, the object is reconstructed geometrically. The second canvas, however, done from memory in France in 1917, is obviously a recreation not only of abstract form, but of emotion as well (Figure 6). This painting resembles Delaunay's Eiffel Tower fantasies. Its dominant note is a series of swirling, spiraling lines, and round, colored discs. Bits of structural details - the webbed stays and diagonals

⁶John I. H. Baur, Revolution and Tradition in Modern American Art (Harvard, 1958), p. 24.

of the bridge, the corner of a tower - suggest movement on the bridge. In the background, high on the canvas, are forms which suggest the New York skyline. The entire effect is one of extreme, yet controlled motion and rhythm.

Stella, who arrived in America from Italy in 1896, visited Europe in 1909-1911, and fell under the influence of Fauvism, Cubism, and Futurism. He writes about the impact of these movements upon his work in this way:

What excited me most was the vista in front of me of a new panorama, the panorama of the most hyperbolic chromatic wealth. No more inhibitions of any kind for the sake of inanimate sobriety. . . but the full adventure into a virgin forest of thrilling visions, heralded by alluring vivid colors, resonant as the explosion of joy, the vermillion, green, violet, and orange high notes soaring upon the most luscious deep tonalities.⁷

The new movements had obviously released an emotional force in Stella, and when he returned to America, he found a subject commensurate with his feelings. He wrote:

Steel and electricity had created a new world. A new drama had surged from the unmerciful violations of darkness at night, by the violent blaze of electricity and a new poliphony was ringing all around with the scintillating, highly-colored lights. The steel had leaped to hyperbolic altitudes and expanded to vast

⁷Joseph Stella, Autobiographical Notes (Whitney Museum, New York, 1946), unpublished manuscript.

latitudes with the skyscrapers and with bridges
made for the conjunction of worlds.⁸

He was prepared, then, to confront Brooklyn Bridge not only as a thrilling mechanical object, but a "new world" of energy and form.

"To realize this towering imperative vision in all its integrated possibilities, I lived days of anxiety, torture, and delight alike, trembling all over with emotion," Stella wrote about his first Brooklyn Bridge canvas (Figure 7). This painting differs considerably from his later images of the bridge; stylistically, this work is more complex. Its most striking features are the long horizontal and diagonal "lines of force," which cross at the top-center of the canvas in an inverted V. The lines look like rays of searchlights, suggesting a dynamic movement. This movement is superimposed over repeated images of the twin Gothic arches in the towers; the receding images of the towers together with the "lines of forces" animate the canvas. Also, they give to the picture a sense of endless depth. Along with the straight lines, there are also arched lines and circular discs surrounding the central figures of the repeated towers. Across the top of the canvas there is a flat bow-like arch, which suggests the dominant curve of the bridge itself. At the bottom-center of the painting, there is a curious prismshaped form - another device which suggests movement and

⁸Ibid.

geometric complexity. Also, the light in the painting is quite strange; it emerges from at least a half a dozen sources, from matrices of diagonals, horizontals, and curves. It gives a mysterious night-time quality to the picture - which in its overall tone is quite dark.

This painting differs from Stella's later portraits of Brooklyn Bridge in several ways. First, the bridge towers are the only representational images in the painting; there is no evidence of the city, or of other details of the bridge. Thus, the painting, following the Futurist theory, has distinegrated the object, and reconstructed it with the aid of stark devices like the "lines of force" to suggest the motion and rhythm of the object. The later paintings, as we shall see, are considerably more representational. Second, there is a distinctly ominous tone to this painting. Not only the eerie lighting, but also the recesses, suggesting echo chambers, that one finds throughout the canvas, gives one the sensation of mystery and uncertainty. Stella's own description of his work on this painting conveys the same unsettling impression:

I appealed for help to the soaring verse of Walt Whitman and to the fiery Poe's plasticity. Upon the swarming darkness of the night, I rung all the bells of alarm with the blazes of electricity scattered in lightnings down the oblique cables, the dynamic pillars of my composition, and to render

more pungent the mystery of the metallic apparition,
 through the green and the red glare of the signals
 I excavated here and there caves as subterranean
 passages to infernal recesses.⁹

In short, the canvas, insofar as it is an interpretation of Brooklyn Bridge, is unmistakably ambivalent. Along with celebration, the artist expresses fear of the "metallic apparition."

Stella painted Brooklyn Bridge again in 1920-1923 in his five panel work, New York Interpreted. This is an ambitious work, having, as Oliver Larkin writes, "the intensity of stained glass and the monumentality of murals."¹⁰ Stella's intention was nothing short of expressing the total impact of New York. This intention owes much to the Futurist ideas, but also to the temper of the times; we find similar efforts in literature, in works like William Carlos Williams' In The American Grain as well as in Waldo Franks novels, in the photography of Alfred Stieglitz, in the music of Ives, Siegmeyer, and Copeland. The title of the paintings, in other words, reveals Stella's connection with a current of thought in his period. Hart Crane, responding to the same current, hoisted Brooklyn Bridge to the role of chief symbol of American life. In this work, Stella subordinates the bridge to the skyscraper. The

⁹Ibid.

¹⁰ Oliver W. Larkin, Art and Life in America (New York, 1957), p. 384.

central panel, larger than the others, is based on the Flat Iron building which, with its prow-like appearance, serves as the main motif. The other panels are based on the bridge, the port, and the White Way. The entire work is unified by the use of the familiar "lines of force," horizontal, diagonal, and curving. Verticals are accentuated. Stella wrote about this work that he wanted to show New York "as a monstrous steely bar erected by a modern cyclops to defy the Gods with the dazzling of a thunderbolt."¹¹

Stella wrote that the inspiration for this work came to him at the Battery, when suddenly, he felt the full impact of the harbor, the tall buildings, the bridge, and the subway tubes. He decided on the five panel form, a long rectangular, in order to give a simultaneous effect of all five phases of the city. He thought of the work, therefore, as a symphony, with a dominant theme and variations. The theme was the conjunction of free energy with geometrical precision in the technological forms of the city. He writes:

The depth of night tempers and renders mysterious the geometrical severity of the skyscrapers, of the bridge, of the port, while the deep Antwerp blue of the sky, in the white ways, is raging madly in the whirlwind of the simultaneous mimic advertisement animated by the poli-chromatic riot of a new poliphony.¹²

¹¹Stella, Op. cit.

¹²Ibid.

In the bridge panel, the geometric severity rather than the whirlwind is stressed, and in comparison with the first Brooklyn Bridge painting, this makes all the difference (Figure 8).

In the bridge panel, the towers and the Gothic arches are the chief structural facts of the composition. The arches are projected into the foreground, and serve as windows, through which one sees the second tower and arches in the distance, and rising, angular skyscrapers along the far horizon. In front of the main tower, two cables swoop down and out toward the viewer, forming an inverted V; the lines of the cables, however, are curved gently, opposed to the stark perpendiculars of the earlier painting. Also, the lines are clearly cables; thus, Stella integrates the "lines of force" with the representational subject. Running vertically from top to bottom at the center of the canvas is the central pier of the tower, dark and slim. Altogether, the curved cables, the solid vertical pier of the tower, the broken arches, and the thin verticals of the supporting stays receding into the distance, give the effect of a rigorously controlled composition. Below the bridge, as one can see through the cables and arches, is a vague mass of floating forms. Absent from this image of the bridge are the caves and mysterious lights of the earlier painting. The bridge in this version

is indeed triumphant and aloof; it is separate from the wild forms of the city beneath. Stella wrote:

The bridge arises imperturbable with the dark inexorable frame among the delirious raging all around of the temerarious heights of the skyscrapers and emerges victorious with the majestic sovereignty sealed on his arches upon the subjugated fluvial abyss roaring below with the moanings of appeal of the tug-boats.¹³

The bridge in this view, it is clear, does not partake of the mere energy of the city, but instead, is an ordering principle.

In later versions of the bridge, American Landscape, 1929, and The Brooklyn Bridge - Variation on an Old Theme, 1939,¹⁴ Stella retains this view of his favorite subject. In these works, the towers, Gothic arches, and down-swooping cables, stand up forcefully in the foreground, and provide a frame for the skyscrapers and other abstract forms on the horizon. We see the city through the bridge. At the same time, the emphasis on the Gothic arches and the inverted V of the cables, give all these later paintings a decided upward accent. The cathedral suggestion is unmistakable. It is not too extreme to say, then, that the personal emotion Stella invested into the canvasses was akin to the religious emotion. His compositions follow the lines of force of the bridge itself; his

¹³Ibid.

¹⁴See Brooklyn Bridge, 75th Anniversary Exhibition.

feelings, meanwhile, follow the lines of force of his culture. What we cannot forget, however, is that, although the bridge has touches of divinity in the later paintings, it did indeed have touches of the demonic in the very first painting. Stella, it is clear, participated in the cultural drama of American life since the pre-Civil War days, the drama based on the question: what is the Machine, God or devil, good or evil?

III

Hart Crane's Bridge to Cathay: The Final Passage

The time is barren, and therefore its poet overrich.

Heidegger, "Hölderlin and the Essence
of Poetry"

The popularity of Brooklyn Bridge as a subject for painting is matched by its popularity in literature. As in painting, not every appearance of the bridge in literature is significant to this study. When a writer mentions the bridge, he is not necessarily using it as a theme; it could be, as it frequently is, merely a bridge. Also, in both novels and poems, the bridge might be mentioned in passing, as a landmark, without any special significance. But the fact is that Brooklyn Bridge has indeed been used by some writers in a

deliberately significant way. For example, Ernest Poole, John Dos Passos, and F. Scott Fitzgerald, refer to the bridge in ways that exploit the special associations of the bridge as an admired, a noble, a different object in the city. Thomas Wolfe and Henry Miller, in their autobiographical New York narratives, address the bridge directly, and it becomes the occasion for feelings of some importance in the works. Aside from the well-known case of Hart Crane, other poets have written verse addressed to, or about the bridge.¹⁵ There is, in short, sufficient material to make up a minor tradition of literary uses of Brooklyn Bridge - a tradition which leads to Hart Crane's, The Bridge.

The Bridge, after T. S. Eliot's The Waste Land, is perhaps the most widely-read long poem in America in the twentieth century. Unfortunately, it has been read chiefly in light of certain statements Crane made about his intentions, and rarely in light of its own poetic merits. Most critics line up on the intentions; some, like Allen Tate and Yvor Winters, think the poem failed before it began because of the intellectual poverty of Crane's goals. Others find the conception perfectly sound, logical and clear.¹⁶ Most

¹⁵See Appendix B.

¹⁶See Allen Tate, Reactionary Essays (New York, 1936), Yvor Winters, In Defense of Reason (New York, 1947), and R. P. Blackmur, Language as Gesture (New York, 1935). For a

readers, regardless of their view of the intentions, agree that the poem fails in some manner to realize the poet's hopes - and all readers think that the poem is a significant one, whether doomed from the outset, or merely flawed in execution. My own view is that success or failure are not proper terms to use in evaluating a work of literature, until we have learned what, in its smallest details as well as its largest design, the poem is. Success or failure are meaningful only if they are literary terms, if they refer to the poetry itself. It seems to me the poem has impressed its readers more as an issue than as poetry.

But to read The Bridge exclusively as a poem, I must add, is not my purpose. I am also concerned with it as a document of culture in America. These two purposes, the cultural and the literary, are not, I like to think, always at odds with each other. The cultural documentation of The Bridge is nothing more than the transfiguration of a real object into an imagined object, the real bridge into the bridge of the poem. The transfiguration embodies both personal and cultural values laid upon the plain physical fact of the bridge. Therefore, I plan to read the poem with this question foremost: what is Brooklyn Bridge in the poem? What sort of existence does it have?

recent defense of The Bridge, see L. S. Dembo, Hart Crane's Sanskrit Charge (Ithaca, New York, 1960).

Whatever its shortcomings, The Bridge has a consistency of design which is more and more impressive at each reading. The design is not a narrative in the usual sense. Rather, it is a process, a progression, or more exactly, a pursuit. What is being pursued is a state of consciousness. It is what Plato calls the "soul" - that intangible condition which has "veritable being." Brooklyn Bridge serves the lofty role of a tangible model of the Ideal Form which lies beyond the perception of men. The bridge is a white, pervasive Paradigm." In the final section of the poem, "Atlantis," the poet attains the pursued state of harmony through a direct experience with the bridge. But, as a paradigm, the bridge gives unity to the poem by appearing in various forms throughout the entire sequence. Images and motifs derived from the bridge run through all the phases of the pursuit.

If Brooklyn Bridge in "Atlantis" is an access to the Platonic soul, then clearly it is not meant to be merely an emblem of American progress. In fact, the bridge's relationship to America, and to history in general, is a complex one. The entire poem, as I have said, is a pursuit of an absolute state of consciousness. The pursuit is historical only in the sense that it occurs in time. What is being pursued, however, lies out of time; it is without dimension, without substance, without shape or sensuous form. In "Atlantis,"

the bridge, transfigured into images of music, is the threshold of this inarticulate experience.

And like an organ, Thou, with sound of doom -

Sight, sound and flesh Thou ledest from time's realm

As love strikes clear direction for the helm.¹⁷

The bridge partakes of, but is not itself, the Ideal. It is the "beautiful object," beautiful in sight and beautiful in sound, which, as Plato writes in The Symposium, leads man, through love, to Beauty itself, "simple, pure, uncontaminated. . . the divine, the original, the supreme, the monoeidic beautiful itself." Beauty, Plato points out, rests upon harmony, and harmony in turn rests upon love among things that differ, that is to say, upon a reconciliation of differences. As an epigraph to "Atlantis," Crane used this passage from The Symposium: "Music is then the knowledge of that which relates to love in harmony and system." Through music, the soul can come to recognize itself.

For Plato, the way one moved from the beautiful object to Beauty itself was not a historical process. To be sure, it was based upon the continual exercise of discipline. Yet, its direction was a

¹⁷Waldo Frank, ed., The Complete Poems of Hart Crane (Anchor Books, New York, 1958), p. 61. All references are to this edition.

withdrawal from time, from the world of shadowy forms to the world of essences. Crane, however, influenced by motley currents of thought in the 1920's, must have had Hegel in mind as well as Plato, for he sees the process of attaining the absolute as a historical evolution. For example, the bridge in "Atlantis," as a paradigm of the Ideal, brings together images which are fragmentary and unfulfilled throughout the poem. The pursuit of these forms urged Columbus across the seas into the unknown, and thus got America started in the first place. But Columbus' vision is not complete; we see him in "Ave Maria" returning to Spain, bearing the Word but not the fact of his discovery. From Columbus to modern America, the brightness of that Word has dimmed, and the poet-hero, the "I" of the poem, awakes in "The Harbor Dawn" with dim stirrings of the original pursuit. He takes his way through the city, attempting to recover the quest. At this early stage of the poem, he is like Rip Van Winkle.¹⁸ Passing through the present, he recalls the past. Like Rip, the poet-hero feels himself out of time; he is

slowly made aware
that he, Van Winkle, was not here
nor there. . . (p. 14)

¹⁸For a provocative discussion of the mythic elements in

In "Van Winkle," the memory is personal, of school days with Pizarro and Cortez, of the garter snakes under the cinder pile, the paper airplanes. These personal memories fuse with the historical memories of America. In "The River," the poet enters the backward flow of history; he joins the hoboes who hold "to childhood like some termless play." The Mississippi, the river of time, takes him back, "over De Soto's bones," to the primitive age of the land. In "The Dance," the poet witnesses and joins the ritual union of Pocahontas and Maquoqueeta; their dance represents the union of space and time, "The serpent with the eagle in the boughs." In the dance, the poet at last finds the source of his dream in "Harbor Dawn." The dance initiates him into the primal impulse of the land, which are mythic and timeless. Then, struck with the eternal image of Oneness with the land and the universe, the poet picks his way back into time, working his way, through "Indiana," back to the present. Re-entering history, the poet loses the freshness of his direct touch with the primal Oneness; the experience of

American legends, see Philip Young, "Fallen from Time: The Mythic Rip Van Winkle," Kenyon Review, Vol. 22 (Autumn, 1960), pp. 547-573, and "The Mother of Us All: Pocahontas Reconsidered" (unpublished). I would like to thank Mr. Young for allowing me to read the second in manuscript, and for listening critically to many of the ideas in this entire study.

the dance becomes a vague dream. It is, however, a spur to the pursuit of another such experience, a fully contemporary one. This will occur on Brooklyn Bridge, in "Atlantis." Meanwhile, the poet finds distorted reminders of the pursuit in the images of the modern world, in the old seamen and mechanical juke-box dreams of South Street in "Cutty Sark," in the aviators in "Cape Hatteras," in the burlesque queens of "National Winter Garden," and in the "Scalped Yankees," the New England fathers who have sold out to Powitzky in "Quaker Hill."

The poet-hero keeps to his pursuit. Inspired on by the faith of Walt Whitman and Emily Dickinson, as well as the memory of Pocahontas, he searches for the splintered remains of the original pursuit. Like Whitman in "Cape Hatteras," he wants to "see"

the rainbow's arch - how shimmeringly stands

Above the Cape's ghoul-mound, O joyous seer! (p. 41)

To secure this vision of an arch rising from the dead, the poet, like Columbus, must test his word. Now, however, when "the resigned factions of the dead preside," the test is not water, but the inferno of "The Tunnel." The poet asks this question in "Quaker Hill:"

So, must we from the hawk's far stemming view,

Must we descend as worm's eye to construe

Our love of all we touch, and take it to the Gate

As humbly as a guest who knows himself too late,

His news already told? (p. 51)

The question is answered in the epigraph to "The Tunnel," the verse by Blake, "To find the Western path/ Right thro' the Gates of Wrath." In the subway tunnel, the poet finds Poe, his head "swinging from the swollen strap." Poe, whose eyes are "like agate lanterns," reminds the poet of the fate of dreamers in a fallen age. The tunnel is death.

And Death, aloft, - gigantically down

Probing through you - toward me, O evermore! (p. 56)

Also in the tunnel, the poet sees the Daemon who has inoculated "the brinking dawn/ With antennae toward worlds that glow and sink" (p. 57). Yet the inoculation, the vision of hope, was cruel, because the Daemon "straightway" dies. I take this figure to be the "daimon" of The Symposium, who "interprets and makes a communication between divine and human things." Diotima tells that "he fills up that intermediate space between these two classes of beings, so as to bind together, by his own power, the whole universe of things." Although the dream dies in the tunnel, it is, at end of the section, resurrected, "like Lazarus," "Unceasing with some Word that will not die." The "worlds that glow and sink" I take to be Atlantis, the land Plato describes, which was once the model of harmony, built

in concentric circles upon an island in the sea. It will glow again in the final section of the poem, where Brooklyn Bridge will serve as the bridge "between divine and human things."

The bridge, then, fulfills a quest which has taken place within history. In this sense, it culminates a movement begun by Columbus. But at the same time, the movement has an a-historical dimension. It begins in mythic time with the dance of Maquokeeta and Pocahontas, and leads to a mythic future in the Atlantis that lies beyond the senses. The conjunction of these two dimensions in Brooklyn Bridge, the historical and the a-historical, requires that bridge be both real and ideal at once. Does Crane convince us that it is?

The bridge appears explicitly in three poems, "Proem," "Cutty Sark," and "Atlantis." The first is an address to the bridge, an invocation. In the second, the poet, just returned from his journey into the past, leaves a South Street bar, where "Atlantis Rose" is a juke-box melody; he starts walking "home across the Bridge," and on the bridge, has a vision of sailing ships, "skil-/ful savage sea-girls/ that bloomed in the spring." (p. 31) In the last, he crosses the bridge again, at midnight, and reaches Cathay.

It is noteworthy that Crane wrote the last poem first; "Atlantis," in fact, contains the germ of the entire poem. It is profitable, then, to examine it first.

The idea of writing a long poem using Brooklyn Bridge occurred to Crane early in 1923. He had just completed another Platonic poem, For the Marriage of Faustus and Helen (1922). T. S. Eliot's The Waste Land (1922) had just appeared. Crane, feeling in himself the powers of Whitman, wrote to a friend that The Bridge would be a rebuttal to Eliot's "complete renunciation" of modern life.¹⁹ He rebelled against Eliot's apparent hopelessness. "The city," Crane wrote to Alfred Stieglitz, "is a place of brokenness, but when a certain development in this intensity is reached, a new stage is created, or must be, arbitrarily, or there is a foreshortening, a loss and a premature disintegration of experience."²⁰

But why Brooklyn Bridge? And how arbitrary of a symbol would it have to be? In one of his earliest statements about the poem, Crane wrote, "The initial impulses of 'our people' will have to be gathered up toward the climax of the bridge, symbol of our constructive future, our unique identity, in which is included also our scientific hopes and achievements of the future."²¹ This statement

¹⁹Brom Weber, ed., The Letters of Hart Crane (New York, 1952), p. 127.

²⁰Ibid., p. 138.

²¹Ibid., p. 124.

gives a public character of the bridge, quite similar to that of the Opening Ceremonies in 1883. But in the earliest lines Crane wrote, the bridge is hardly a public symbol - nor indeed, is it much of a symbol at all. Instead, it is location of an experience, the place where something emotional happens to the poet. In these lines written in 1923, the poet stands at the center of the bridge, with arms

That open to project a salient disk

That winds the moon and midnight in one face,²²

At that "expansive center," he feels a presence "That guards like eyes that must look always down/ In reconciliation of our chains and ecstasy." He hears "The looms, the wheels, the whistles in concord/ Tethered and welded as the hills of dawn." The bridge reconciles the disharmonies of the poet's life. The bridge itself has no distinct form. What it "stands for" is a very personal experience, one indeed which Crane describes elsewhere in his letters and in the short poems "Recitative" and "Possessions,"

Surely this would not do for a poem that was to be "a mystical synthesis of America." Crane needed a way to convert his personal experience into a symbolic experience, and to connect it with, so to speak, the world-historical meaning he wanted the

²²Brom Weber, Hart Crane: A Biographical and Critical Study (New York, 1948), p. 427.

bridge to have. The initial difficulty was this: the personal experience itself was nothing more than an intense sensation of harmony within and without. The bridge, in some unclear way, was responsible for the sensation. Crane needed a concept that would link the bridge directly with the sensation, and make the sensation significant in a public sense. He found what he could use in a book by his friend Gorham Munson, a study of another friend, Waldo Frank. Both Munson and Frank were concerned with the Machine in modern life. The book appeared, and Crane read it, early in 1923, shortly after Crane got his idea for the long poem. Munson wrote that the only way to assimilate the Machine was through the emotions. Modern culture, he wrote, is maladjusted because the Machine has intruded upon the previously harmonious relations between man and nature. However, rather than reject the machine, as the Eliot group seemed to be doing, Munson proposed that artists undertake to create forms "to put positive and glowing spiritual content into Machinery." The Machine, he pointed out, gives us "sensations which lie undigested in our spiritual anatomy like pebbles." The task for modern art was to digest the Machine.²³

Crane responded to these ideas with the enthusiasm of a convert. He wrote to Munson that his "very rich suggestions. . .

²³Gorham B. Munson, Waldo Frank, A Study (New York, 1923), pp. 22-23.

on the treatment of mechanical manifestations of today" will figure in a large way in The Bridge. Here, then, was a way to endow the personal sensations on the bridge with universal significance. Developing this hint in "Atlantis," Crane followed two parallel tracks. One, he incorporated a great many structural details of the bridge, such as the cables and the towers. This has the effect of giving his emotional experience at least a partial physical cause in the poem. Two, he worked out a pattern of metaphors to "digest" the structure. It took him several years to do this. In 1926, he wrote a friend, "the bridge in becoming a ship, a world, a woman, a tremendous harp (as it finally does) seems to really have a career. I have attempted to induce the same feelings of elation, etc. - like being carried forward and upward simultaneously - both in imagery, rhythm, and repetition, that one experiences in walking across my beloved Brooklyn Bridge."²⁴

The major metaphors in the final version of "Atlantis" are musical and nautical. The bridge becomes a giant aeolian harp as well as a voyaging sea-craft. The metaphors, to be sure, do not change the fact that the bridge is still the location of an intense experience of harmony. Now, however, the personal harmony is also cosmic harmony. The expansion of meaning is clear in the first two stanzas of the poem:

²⁴Weber, Letters, p. 125.

Through the bound cable strands, the arching path
 Upward, veering with light, the flight of strings, -
 Taut miles of shuttling moonlight syncopate
 The whispered rush, telepathy of wires,
 Up the index of night, granite and steel -
 Transparent meshes - fleckless the gleaming staves -
 Sibylline voices flicker, waveringly stream
 As though a god were issue of the string. . .

And through that cordage, threading with its call
 One arc synoptic of all tides below -
 Their labyrinthine mouths of history
 Pouring reply as though all ships at sea
 Complighted in one vibrant breath made cry, -
 "Make thy love sure - to weave whose song we ply!"
 - From black embankments, moveless soundings hailed,
 So seven oceans answer from their dream (pp. 59-60).

Here, we move across the bridge, sloping upward on the "arching path." The cables are strings and staves, suggesting both a musical instrument and a sailing vessel, upon which the moonlight alternates with the "whispered rush" of the wind in the network of cables. The setting is full of ominous movement, for the sounds

are "sibylline voices." The voices, a "call," have a shape; they form "one arc synoptic of all tides below." That is, they delineate the paradigmatic character of the bridge. The tides also have voices, "labyrinthine mouths of history," which reply to the call of the bridge. (The compacted meanings of "reply," "complicated," and "ply" are a good instance of Crane's technique; "ply" means altogether "weaving," "rowing," "urging," and "supplying.") History, that is to say, answers the call of the Ideal. History and the Ideal join their voices to urge the poet to "make thy love sure."

In the next stanzas, the movement continues upward. In stanza three, the poet reaches the towers.

And on, obliquely up bright carrier bars

New octaves trestle the twin monoliths. . . (p. 60)

In stanza four, his eyes, "like seagulls stung with rime," move up the cables, picking their "biting way up towering looms," and link the past, the "timeless laugh of mythic spears," with the present. In stanza five, the past appears with references to Tyre and Troy; the poet sees the voyager Jason, "still wrapping harness to the swarming air," still, that is, questing the golden fleece. In stanza six, it is exactly midnight, as the bridge lifts "night to cycloramic crest/ Of deepest day." This is the center of the poem,

and the poet is at the center of the bridge. Here the bridge's music is fullest.

O Choir, translating time

Into what multitudinous Verb the suns

And synergy of waters ever fuse, recast

In myriad syllables, - Psalm of Cathay!

O Love, thy white, pervasive Paradigm. . .! (p. 61)

At this moment, time and history are "translated" by the bridge into the Word; as the Psalm of Cathay, Columbus's dream, the bridge is now the complete paradigm of the Ideal. We are now on the verge of eternity. In stanza seven, we are "Pacific here at time's end, bearing corn," and we hear "one song" from the bridge's "deathless strings." In stanza eight, the theme is repeated; the bridge is a "steeped Cognizance," an act of knowledge, uniting the many in a "single chrysalis." It is a flower, a bird (it leaps into absolute knowledge like the lark), and an organ, leading "from time's realm." In stanza nine, the bridge is an "intrinsic myth" which is not only undying, but "Whose fell unshadow is death's utter wound." As a deathless and shadowless myth, it heals the broken cities.

With white escarpments swinging into light,

Sustained in tears the cities are endowed

And justified conclamant with ripe fields

Revolving through their harvests in sweet torment (p. 62).

The bridge reconciles the city and nature.

In stanza eleven, the poet addresses the bridge as Atlantis, the floating island. The Journey, he writes, has been like

Migrations that must needs void memory,

Inventions that cobblestone the heart.

The bridge has removed the poet from history, from pain and conflict. He asks the bridge "Thy pardon for this history," justification for the passage through time to the threshold of the timeless. He also asks the bridge to support him, to "hold thy floating singer late!" The cables of the bridge "leap and converge" in the climax of the experience. "Is it Cathay. . .?" the poet asks. The answer comes in "whispers antiphonal" swinging in the sky; it comes in the pity (the pardon) in the grass and the rainbow which "rings/The serpent with the eagles in the leaves." Like Pocahontas, the bridge joins space and time, and accepts the poet.

In the argument of "Atlantis," the poem reaches the conclusion Crane started with in 1923, that Brooklyn Bridge is a "mystical synthesis of America." To serve this role, we have seen, the bridge is transformed into a series of images, mainly musical and nautical,

that give it its Ideal character. The effect of these images is to divest the bridge of its associations with the Machine. The poem, however, does not show the divestment as a process, but states it as an accomplished event. Is the bridge divine to begin with, and thus, not a material object at all? Is it only a symbol, and not a fact? This is a troublesome question, because, while the dominant emotion of the poem is rapture, the poem fails to show a credible source of the rapture. What I find missing is a convincing dialectic between the poet and the factual bridge, through which it might emerge as a genuine symbol.

A close look at the "Proem" will make this criticism clearer. The poem has an interesting background. Just before Crane composed the "Proem" in July, 1926, he faced a serious crisis. He read Spengler, and his faith in American destiny weakened. The chance that Spengler was right, that western civilization had passed its crest and that nothing remained for poets to affirm, distracted Crane. As for Brooklyn Bridge, he wrote: "The bridge as a symbol today has no significance beyond an economical approach to shorter hours, quicker lunches, behaviorism and toothpicks.²⁵ A month later, he wrote to Waldo Frank. "I feel an absolute music

²⁵Ibid., p. 232.

in the air again, and some tremendous rondure floating somewhere." He had pulled himself together by composing the "Proem," and said to Frank, "perhaps my little dedication is going to swing me back to San Cristobel again." It is, he wrote, almost the best verse he had ever composed, "something steady and uncompromising about it."²⁶

Crane's composition of the opening stanzas was quite subtle. He pointed out to Frank that the construction "parallels the peculiar techniques of space and detail division used by El Greco in several canvasses - notably the Christum am Olberg [sic]." In this painting, space relations are defined by planes of light and shadow. The figure of Christ is central, and as a result of extreme foreshortening, it is in a plane all its own. The other figures, including the landscape and sky, are in their own linear fields, all angled toward the central figure of Christ, which is thus projected forward as a vortex. Intersecting shafts of light and circular planes reinforce the extreme tension in the painting. The movements are mainly in curves, the equivalent of "dip" and "pivot" in the following stanzas:

How many dawns, chill from his rippling rest
The seagull's wings shall dip and pivot him,
Shedding white rings of tumult, building high
Over the chained bay waters Liberty -

²⁶Ibid., pp. 260-261.

Then with inviolate curve, forsake our eyes
 As apparitional as sails that cross
 Some page of figures to be filed away;
 - Till elevators drop us from our day . . . (p. 3)

The seagull rises from his rest at dawn, like the birth of a soul. The movement, in circles and curves, is both free and controlled. In the second stanza, the wings of the seagull do not merely disappear, but "foresake" our eyes, which strain after the whiteness, the "inviolate curve." These lines inaugurate the pursuit of the Ideal. Then, the next two lines subtly shift the plane of perception away from the Ideal to the real. The gull's wings flow out of sight as sails (suggesting the journey toward Cathay), and reappear transformed into "some page of figures." The shift is made with great control, not only by the syntax which links "wings" and "page" through the analogy of "sails," but also through the changing connotation of the verbs. The progress from "dip" and "pivot" to "foresake" and "cross," and finally to "to be filed away," is from the organic motion of the bird to the mechanical motion of the city. The contrast between the gull's wings, which move out of sight by their own volition, and the passive page of figures, tells the difference between the natural and the mechanical. The next line suddenly "drops" us from our day; we feel how decisively the movement has been downward.

The next two stanzas give us a street-level view; they also give us a viewer:

I think of cinemas, panoramic sleights
 With multitudes bent toward some flashing scene
 Never disclosed, but hastened to again,
 Foretold to other eyes on the same screen;

And Thee, across the harbor, silver-paced
 As though the sun took step of thee, yet left
 Some motion ever unspent in thy stride, -
 Implicitly thy freedom staying thee! (p. 3)

The movement is reversed; it goes upward. Furthermore, the movement is not made through a subtle transition of verbs as in the first two stanzas, but instead through a new element, the person of the poet. The two stanzas are two scenes in the poet's mind; "cinema" in stanza three and "Thee" in stanza four are both objects of the verb "I think." Each scene represents a different kind of motion, a different kind of vision. They are violently opposed to each other. The action in the cinema is erratic, nervous, unfulfilled. The frustration comes from a deprivation of sight. The bridge, meanwhile, is clear and full in the sun. The motion of the bridge is the sun's motion, as it moves across the diagonal

stays. The sun integrates the bridge with nature, and gives it a motion analogous to the gull's, free and self-renewing; it is never spent. Moreover, the bridge, like the Christ figure of El Greco, is the vortex of the scene; to see it, we must look up.

In these four stanzas, Crane gives us the central conflict of The Bridge, the opposition of the real and the Ideal. The drama of the sequence, then, begins with an implied question: can the conflict be resolved? In "Atlantis," the answer seems to be "yes." But we are not told how. The resolution happens behind the scenes.

As we read on in the "Proem," we suspect that it could happen no other way, if it was to happen at all. After the conflict portrayed so sharply in the opening stanzas, the poet as a figure virtually disappears from the scene. The next stanzas continue the opposition between the violent and agitated city and the aloof, self-possessed bridge. Except for the traffic lights in stanza nine, the bridge, in fact, is presented through its divine attributes rather than its physical particulars, as in stanza four. The figure of the poet reappears in stanza ten. It is night, and he is standing near the bridge.

Under thy shadow by the piers I waited;

Only in darkness is thy shadow clear. (p. 4)

From the point of view of the city, of history, the Ideal is only a shadow. (In "Atlantis," the bridge is shadowless.) The poet addresses the bridge:

O Sleepless as the river under thee,
 Vaulting the sea, the prairies' dreaming sod,
 Unto us lowliest sometime sweep, descend
 And of the curveship lend a myth to God. (p. 4)

The poet invokes the bridge as a timeless parabola, an abstract form which unites the sea and the earth. He asks the bridge to provide the myth that will resolve the conflict of the opening stanzas.

Whether the bridge will answer the prayer is, as I have suggested, problematical; it sets the plot going. But the crucial point here is the posture of the poet, waiting in the shadows. It is interesting to compare him with the bedlamite in stanza five, another user of the bridge. The bedlamite also rebels against the city. But he does so by a total surrender of self-control. His transcendence of the city is insanity and suicide. He is therefore a victim, though ironically, by throwing off the super-ego which keeps most people from becoming screaming bedlamites, he is also a victor. The poet's transcendence, on the other hand, is his religious faith. He is quiet and still in the shadows. But, he has a great deal in common with the bedlamite. He too has surrendered something. He has surrendered his will, his ability to act. He waits passively, for the sensation of grace.

In "Atlantis," the bridge answers the prayer by receiving the poet into its timeless recesses. As a state of ultimate consciousness, Cathay resolves all conflicts. But, as I have shown, the experience in "Atlantis" is forced and unconvincing. It is not rooted in the initial conflict of the "Proem." The Ideal merely appears as the real disappears. I am sure that Brooklyn Bridge moved Hart Crane deeply, but when he tried to base a myth of modern life upon his feelings, the real bridge, the only source for the symbolic bridge, eluded his grasp. It became an abstraction, an idea of eternity.

Hart Crane's mind and heart were divided on the issue of the Machine in American life. He saw the need to integrate, and thereby master the Machine through poetry. Brooklyn Bridge, because of his personal associations with it, seemed a likely symbol for an epic of modern life. But Crane failed to acknowledge at the outset that the bridge as a fact was also a Machine. He failed to acknowledge that part of the bridge to which Henry James responded. Instead of building the symbol upon the fact, Crane escaped into the immensities.

Crane's poem comes after nearly half a century of existence for Brooklyn Bridge. In that time, it served many Americans as a symbol of their common life in the age of cities and machines. By

asking it to serve as an epic symbol, Crane unwittingly revealed its limitations. As a fact, the bridge serves a mechanical function: it is a highway for heavy urban traffic; it is a dumb servant of urban expansion. As a symbol, it connects past and present, and it glorifies, in its monumental aspect, the present. In order to keep both parts of the bridge together, the fact and the symbol, one must accept its first function as consistent with its second. One must accept the city as worth celebrating. In the twentieth century, very few American artists were able to do this. The city stood for alienation and confusion, for the disruption of life. To serve symbolically, then, Brooklyn Bridge had to become only a symbol; its factual side got in the way. This is the shadow of a myth which Hart Crane has bequeathed to us.

APPENDIX A

A NOTE ON BRIDGE ARCHITECTURE

Before the technological revolution of the nineteenth century, the dominant bridge form in Europe was the masonry arch. This form had prevailed since the Romans brought their version of the semi-circular arch to perfection. The Roman style of clearly articulated series of massive arches, each exerting its powerful thrust upon its own abutments and piers, was the major style through the Middle Ages and most of the Renaissance. The roadway on most Roman bridges was carried as a flat surface upon the vaults of the arches. The most famous example is the Pons Augustus at Rimini, Italy. This bridge was studied in detail by Palladio, and became a chief model of Renaissance construction. Not until the eighteenth century and the first engineering school, the Ecole des Ponts et Chausses at Paris in 1747, did this form give way to another, more scientific arrangement of arches. Perronet, the first director of this school, developed the idea of the segmental arch, which could be built in a series of interdependent units. The radical effect of the segmental arch was that the thrust could be transferred beyond the immediate pier to the

abutments on shore. Thus, the vertical piers of each individual arch could be lightened drastically, giving the entire structure a lighter appearance. A longer, flattened arch replaced the massive, semi-circular arch of the Romans. Freeing the individual arch from its supporting piers made possible a continuous structure of quite graceful curves, as in Perronet's Pont de Neuilly (1768-1774) and Pont de la Concorde (1786-1794), and in the Waterloo and new London bridges of John Rennie.

These technical developments began the important process in bridge design away from Roman mass weight to modern line and grace. Modern design depends upon modern materials, such as steel and reinforced concrete. Stone slowly disappeared from bridges, and when it was used in small bridges of the nineteenth century, its appeal, as in H. H. Richardson's lovely undulating design in the Boston Fenway (1880-1881), was frankly based on traditional associations - on massiveness, rough texture, and fitness to rustic setting.

Decorative and ornamental motifs played no role in the emergence of a modern bridge esthetic. In the past, however, ornament was an important part of bridge design. In fact, bridges were often heavily decorated. We have become accustomed in the twentieth century to think of modern bridges as strictly traffic

highways continued over rivers or other chasms. Their function is completely utilitarian, and whatever visual pleasure they give as naked statements of structure is by and large a gratuitous one. An ugly bridge can serve traffic as well as a beautiful one; the Manhattan Bridge, in fact, is more efficient than Brooklyn Bridge. Speeding along in mechanized vehicles, we are hardly aware of the bridge as anything but a highway; their beauty strikes us only from a distance, when we can afford to linger in safety. We approach the bridge at high speeds, and frequently, only the toll station reminds us where land ends and bridge begins. Also, the toll station is sometimes the sole ornament which indicates to our eye the nature of the structure we are approaching. Any other ornament would be distracting, and inconsistent with the function of supporting fast-moving vehicles.

In the past, however, bridges were frequently much more than simply the means of passage. Or, to put it differently, passage itself was more than a matter of bare utility and convenience. Ornament was frequently used quite extensively to identify what the bridge meant to the community it served. In ancient and medieval days, many bridges were directly associated with religious, military, and civic institutions. For example, the etymology

of the Latin word "pontifex" suggests how central to religious life the early Roman bridges must have been. The word means literally "bridge builder," and by extension, "high priest." In ancient and medieval times, bridges were often sites of religious ceremonies, sometimes involving the throwing of effigies over the parapet into the flood. This practise was probably a vestige of actual human sacrifice to appease the river gods who may have been offended by the span which defied their power. The famous superstition that "the bridge demands a life" is based on this very ancient practise. Early bridges upon which these practises occurred have not survived, as we have no trace of the ornaments relating to the rituals. The original Pons Sublicus, however, is well-known. It was made of timber, and built and rebuilt by priests. Fraser refers to it as an example of ancient taboos against the use of metal. In the Middle Ages, bridge building was largely in the hands of the Fratres Pontifices, a Benedictine order. Many structures still extant show explicit religious emblems, such as chapels and altars and crosses. The popular Pont St. Benezet at Avignen, built by the saint after a divine visitation "called" him to the task, is the most familiar example of the chapel bridge.

Ornament was also a matter of civic splendour. Bridges in Rome, for instance, were decorated in a manner befitting their imperial setting. The six remaining bridges over the Tiber all have classical orders as merely decorative, non-functional details. The Ponte Rotto, for example, has engaged Corinthian columns in the piers, upholding an ornamented entablature; the arches have elaborate cartouches at their crowns; the spandrels are filled with arabesque sculpture. The ornamentation expresses the civic elegance of Rome in the 2nd century. Ornament, however, was not restricted to classical decoration of the structural arches; roadways, too, were designed as triumphal avenues. Augustus, for example, hoisted heavy decorative arches honoring himself as portals to the Ponte Molle. Perhaps the best example of a monumental Roman bridge built to harmonize with its civic surroundings and whose roadway had a ceremonial significance is the Pont Sant' Angelo (or Pont Aelius), built by Hadrian to connect the Campus Martius with his Mausoleum (134 A.D.). This bridge reportedly had a bronze roof resting on forty columns. It was on this bridge that Gregory the Great had a vision of an angel sheathing a sword, answering his prayer to end the pestilence raging in Rome. Bernini, in the 17th century, added ten sculptured

statues depicting this event to the bridge's parapet at the order of Pope Clement IV.

Outside of Rome, bridges were designed more simply. They command attention by their sheer power, befitting the function as parts of the great Roman road system. Even in the provinces, when the occasion required, an arch of triumph appeared as a portal or as a purely commemorative monument. Examples are the Puente Alcantara, with its central arched tower on the roadway, the memorial bridge at St. Chamas, France, with its twin ornate portal towers, and the Pont Flavien, near Marseilles, with triumphal arches resembling the Arch of Septimus Severus, complete with Corinthian pilasters, entablature and frieze.

See Elizabeth Mock, The Architecture of Bridges (New York, 1949), David B. Steinman and Sara Ruth Watson, Bridges and Their Builders (Dover Books, 1957), Wilbur J. Watson, Bridge Architecture (New York, 1926), Charles S. Whitney, Bridges (New York, 1929), Wilbur J. Watson, "Architectural Principles of Bridge Design," Civil Engineering, Vol. 8 (March, 1938), pp. 181-185, and D. B. Steinman, "Beauty in Modern Bridge Structures," Civil Engineering, Vol. 8 (July, 1938), p. 482.

APPENDIX B

THE BRIDGE IN LITERATURE

In Ernest Poole's The Harbor (New York, 1915), Brooklyn Bridge is the "Great Bridge" of the narrator's childhood in the 1880's and 1890's. It is associated with the Harbor, which represents the hard, commercial side of America, the "reality" to which the older "genteel tradition" closed its eyes. The bridge is not developed as a symbol, but it is remembered and viewed by the narrator off and on through his turbulent life of change, strikes, and social reform in the Progressive period. Sweeping across the sky, high above yet very much a part of the harbor, the bridge is touched by the narrator's nostalgia as he sees the new and ugly steel bridges spring up over the East River. See especially pp. 5, 8, 15, and 319.

Another interesting work of the same period and similar point of view is Dorothy Landers Beall, The Bridge and Other Poems (New York, Mitchell Kennerley, 1913). The bridge of the poem (a dramatic poem) is a new, steel, cantilever arch bridge in the process of erection over the East River. The bridge promises to "link two cities, pride/ With anguish - luxury with agony, / Beauty with equalor!" (p. 36). The opening scene takes

place on the promenade of Brooklyn Bridge, which serves as an inspiration to the builder of the new bridge. His fiancée, however, a fervent social worker, expresses a good deal of ambivalence toward the new bridge. On the one hand, she feels the promise; on the other, however, she feels the new bridge intrudes upon the love between her and her betrothed. The feelings she expresses in this connection are quite suggestive. She calls the bridge "the horrible steel thing." Reconciliation comes when the bridge itself speaks to the girl, reminding her that she herself had once said:

"Meet marvellously somewhere over all,
 Unite these warring cities - teach them peace!
 Let Wealth and poverty - let pride and crime,
 Justice and evil pass and meet and merge
 Into a generous transcending whole." (p. 121)

The Bridge says, "Love me - and wonderfully we shall build/ What spans - what bridges - gleaming open bridges!" (p. 125). And she does, exclaiming, "Quick, O Bridge - rise surely -/ Bridges - world-Bridges, span like sympathy, / Till there are left no bitter gulfs to pass!" (p. 130). On a much different level, of course, this work does suggest that Crane's problem, of conflict between the bridge and the city, was shared by others.

In Dos Passos and Fitzgerald, the bridge is aloof from the city. In Manhattan Transfer (New York, 1925), Bud, on the "footpath," feels he is "walking among the stars." Above the city, with the only peace he has found since his arrival, he falls to his death from the bridge (pp. 124-125). Later in the book, the bridge is "aloof like an arbor" (p. 294). In The Great Gatsby (New York, 1925), the bridge plays an extremely small role. It appears in Chapter 2, in the list of Mr. McKee's photographic studies. "Beauty and the Beast. . .Loneliness. . .Old Grocery Horse. . .Brook'n Bridge. . ." Along with the other titles, the bridge represents a degraded and sentimentalized ideal, thus serving in a very minor way as another index to the decadence of Gatsby's milieu.

In Thomas Wolfe's The Web and the Rock (New York, 1938), a picture of Brooklyn Bridge helps give George Webber his earliest visions of the big city. ". . .a picture of Brooklyn Bridge with its great, winglike sweep, the song and music of its cables, even the little figures of the men with derby hats as they advanced across." (p. 93). The sweep and music of the bridge are referred to several times, as equivalents to Webber's rhapsodic feelings toward the city (pp. 248, 368, 610). Also, Webber's mistress, Esther Jack, tells of a visit with her father, many years ago, to

the famous apartment in Columbia Heights from where the crippled Washington Roebling watched the construction. She says, "The Bridge made music and a kind of magic in me, it bound the earth together like a cry; and all of the earth seemed young and tender" (p. 410).

Henry Miller's feelings about the city are much different from Wolfe's. Wolfe's character is a young man from the country who opens himself to the passion and fascination of the city. Miller's character is a hard-boiled urbanite. For Miller, New York is "Chaos! A howling chaos!" Brooklyn Bridge appears throughout Miller's work, and his use of it shows his difference from Wolfe. For example, in Tropic of Capricorn (Paris, 1939), he writes:

Every time I walked over the Brooklyn Bridge and looked down towards the Navy Yard I felt as though my guts were dropping out. Way up there, suspended between the two shores, I felt always as though I were hanging over a void; up there everything that had ever happened to me seemed unreal, and worse than unreal - unnecessary. Instead of joining me to life, to men, to the activity of men, the bridge seemed to break all connections. If I walked towards the one shore or the other it made no difference: either way was hell. Somehow I had managed to sever my connection with the world that human hands and human minds were creating (p. 72).

Although very much a product of the same minds and hands that had created the technological chaos of the city, Brooklyn Bridge, by

virtue of its aloofness, serves Miller to give him a perspective on his urban life. In this sense, Miller's use of the bridge is more successful than Crane's. It becomes for him a personal rather than a cultural symbol. In a separate essay, "The Brooklyn Bridge," in The Cosmological Eye (New York, 1939), Miller wrote that through his experience of alienation on the bridge, "the bridge ceased to be a thing of stone and steel and became incorporated in my consciousness as a symbol" (p. 350). As a symbol, it connected him with the past. "I was seeking a link which would bind me to the past. The bridge was for me a means of reinstating myself in the universal stream" (p. 347). In this sense, Miller humanizes the bridge through his personal relations with it, as an emotional experience, not as a technological emblem. It becomes for him an access to time, to his own ties with history. "It enabled me to link the two ancestral streams which were circulating between the poles of death and lunacy" (p. 347). As romantic and Transcendentalists as Wolfe and Crane, as much an admirer of Whitman and Emerson as they, Miller's relations with the technological twentieth century are of a provocatively different sort.

The most interesting poems other than Crane's work, are Vladimir Mayakovsky's "Brooklyn Bridge," Atlantic, Vol. 205,

No. 6 (June, 1960), pp. 48-49, and Federico Garcia Lorca's "Unsleeping City, Brooklyn Bridge Nocturne," Poet in New York (Grove Press, 1955), Ben Belitt, trans. Both were written in the 1920's, while Crane was working on his poem. Mayakovsky finds the bridge one of the "good things" in the age of Coolidge. He is "proud of just this mile of steel," and sees in it technological promise and unity. Lorca hardly mentions the bridge; his poem describes the sleepless terror of the city. He warns, however, that the "anatomized butterflies" will arise in the city; he implies that the bridge is a promise that life will return, violently, to the city.

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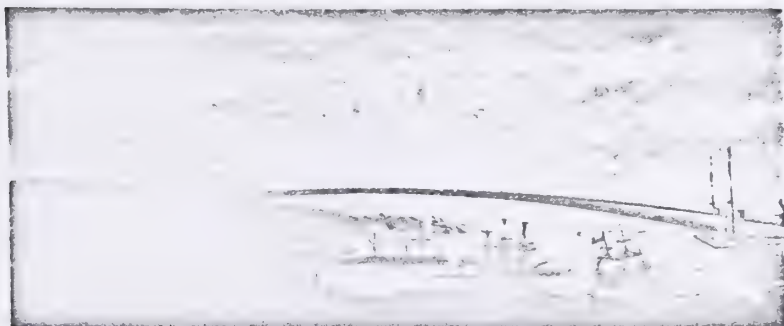


Figure 1. Thomas Pope, THE RAINBOW BRIDGE. 1811.



Figure 2. John A. Roebling, ORIGINAL DESIGN FOR BROOKLYN
BRIDGE. 1869.



**Figure 3. John A. Roebling and Washington Roebling,
BROOKLYN BRIDGE. 1869-1883.**

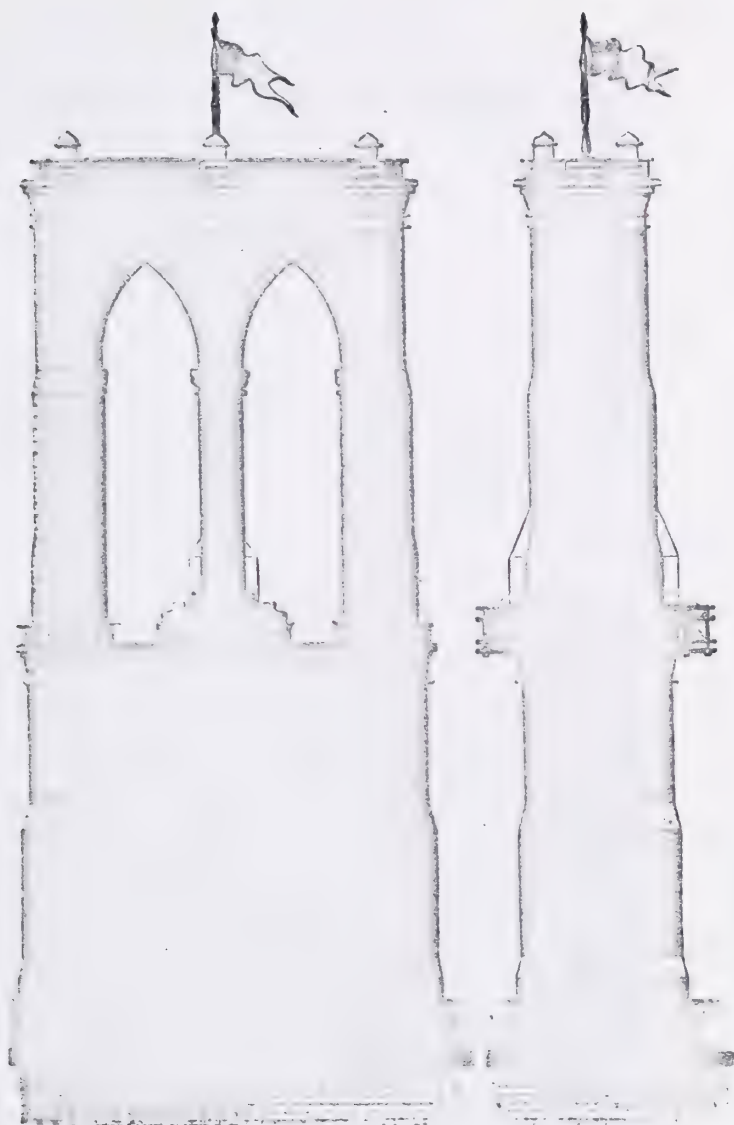


Figure 4. John A. Roebling, DESIGN OF TOWERS FOR
BROOKLYN BRIDGE, 1869.

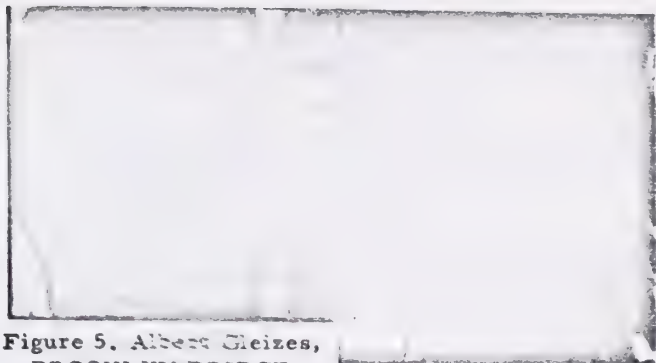


Figure 5. Albert Gleizes,
BROOKLYN BRIDGE.
1915.

Figure 7. Joseph Stella,
BROOKLYN BRIDGE.
1917-1918.

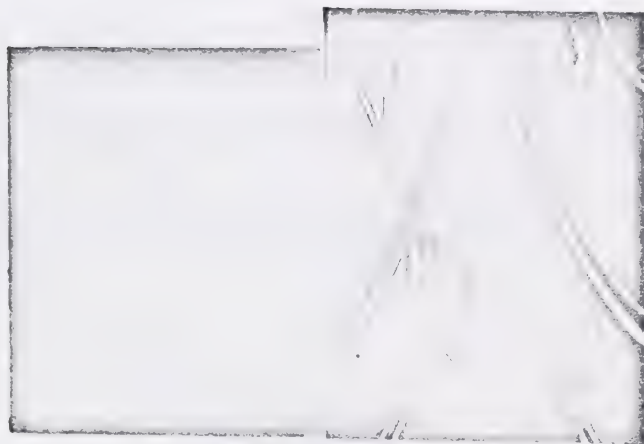


Figure 6. Albert Gleizes,
ON BROOKLYN
BRIDGE. 1917.

Figure 8. Joseph Stella,
NEW YORK INTER-
PRETED: BROOKLYN
BRIDGE. 1920-1923.

ILLUSTRATIONS

1. Thomas Pope. THE RAINBOW BRIDGE. 1811. From Thomas Pope, A Treatise on Bridge Architecture (New York, 1811).
2. John A. Roebling. ORIGINAL DESIGN FOR BROOKLYN BRIDGE. 1869. From D. B. Steinman, The Builders of the Bridge (New York, 1945).
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